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SOME LIVING THINGS

First Lessons in Physiology

HALLOCK

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SOME LIVING THINGS

FIRST LESSONS IN PHYSIOLOGY

BY

ELLA B. HALLOCK

FORMERLY STATE INSTITUTE INSTRUCTOR IN PHYSIOLOGY AND HYGIENE IN NEW YORK AND MASSACHUSETTS

EDITED BY

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WESTERN RESERVE UNIVERSITY

NEW YORK

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TO THE TEACHER

In the Courses of Study of many schools the physiologic topics suggested for study in the lower grades are, The External Parts of the Body, The Organs of Special Sense, and The General Needs of the Body. These topics afford an opportunity for either a broad, interesting, useful work, or a narrow, childish, almost valueless one. There are great possibilities in the topics, but it is necessary for some one to expand them into definite lessons for the busy teacher. Take, for example, the topics relating to the arm. The pupils are to observe the parts, name them, and notice their use. This should be only the beginning of the work, however. If the teacher were to stop here, the work would be less than half done. Not only the arms of man, but the arms of the dog, the horse, the bird, the frog, and the fish, should be studied. The pupils should find them, notice how they differ, the different kinds of work they do, how the different arms are suited

to the work which they must do, and especially the wonderful human hand. Then they should consider the care and training that are necessary in order that the hands may be strong, beautiful, and skilful.

The interest and benefit of this correlated work to pupils are sufficient proof that there should be a place for it, but the teachers, in meeting the heavy demands made upon them to-day, have not time to prepare oral lessons on these topics. Hence, with many misgivings, I have made the attempt to supply pupils, by means of a text-book, with such questions, directions, and information as teachers would use in presenting oral lessons.

Briefly stated, in preparing the lessons I have had the following aims in mind: 1. To study the human body in relation with other living things and the things on which it depends for life; 2. To present subjects as a true teacher would present them orally — not so much by telling facts as by directing the pupils in their observations, thought, and expression; 3. To teach about the human body in such a manner and in such relations that the pupils will be interested in the structure and work of its different parts; 4. To relate the lessons on structure and work to healthful living by

discovering and emphasizing the right use of the various parts of the body and the conditions under which they do their best work; 5. To approach, as far as possible, from the right and the bright side all questions relating to morals — to fill the children's minds, as is done in teaching language, spelling, or number work, with correct ideals — in this case, ideals of health, strength, and beauty; 6. To train pupils not only to see what is healthful and right, but to practise it.

Each pupil should be provided with an inexpensive blank-book of unruled paper. In this book, the drawings of the pupils should be made in a wide margin at the left of each page, and the pupils' statements that answer the questions in the text-book, written at the right.

It may be unnecessary to state that the drawings are not to be judged from an artistic standpoint. They are to express some simple fact that the child has discovered. An artist might consider the drawing of the human figure or any part of it a difficult exercise, but there is not a child that has not from his earliest years made such drawings, and to him they tell some fact. This part of the work must not be made burdensome, but a delight. However crude and childlike the drawings may be, they should be accepted,

if they tell the truths which they are designed to express.

The initials "G. H. C." refer to the Good Health Club that is to be formed in connection with the work. In the back part of each text-book is a blank page which may serve as a sample page for the blank-books of the pupils on which Good Health rules may be entered. At the head of the first of these pages is written the name of the club and underneath this motto, "As I wish to be healthy, happy, and useful, I will try to keep the following rules." The teacher may be the president of the club and the pupils, members. Each member will be free to accept or reject any rule. As the work of forming habits that tend to health, cleanliness, and temperance is as important as any that is done in the school, the pupils should be encouraged to adopt and follow regularly as many of the rules as possible. It would be well to keep a record each week of the rules they are trying to follow. Slowly, as the weeks pass, rules are entered in the blank-books, relating to bathing, dress, diet, the hygiene of eating, abstinence as to injurious appetites, breathing, ventilation, exercise, position and carriage of the body, rest, and sleep — until, in the end, the pupils are following a regulated

"day's order" that touches the physical life at every point. The initials "G. H. C." are inserted at different places in the text-book as suggestions that at these points appropriate rules may be formulated by the "Good Health Club."

In all cases the pupils should get their information, if possible, from the observation of the objects rather than from pictures. The drawings given in the text-book are to be used as an aid when other sources fail. Books or papers containing pictures of animals may be obtained by the children, at home, or from publishers, often for the asking. These should be placed on the teacher's desk for the use of the pupils. Large sketches of the animals, or of the parts of the animals, that are being studied may be made, by the teacher, on manila paper.

A primary text-book on a science can be used more effectively if it supplements oral instruction with lessons in which the different topics are presented as thoroughly as the age and interest of the pupils permit. Because teachers have not the time to prepare oral lessons, the material in this text-book has been so arranged and presented that the lessons may be worked out by the pupils with little or no aid from the teacher.

The following books have been found helpful to teachers in presenting these topics.

FITZ: Principles of Physiology and Hygiene. Henry Holt and Company.

PEABODY: Studies in Physiology. The Macmillan Company.

OVERTON: Applied Physiology. The American Book Company.

ORTON: Comparative Zoölogy. The American Book Company.

MORSE: First Book of Zoölogy. The American Book Company.

HALLOCK: Lessons on the Human Body. A. S. Barnes and Company.

LINCOLN: Hygienic Physiology. Ginn and Company.

REYNOLDS: Primer of Hygiene. The Macmillan Company.

BISSELL: Manual of Hygiene. The Baker and Taylor Company.

WILDER: Health Notes for Students. G. P. Putnam's Sons.

WILDER: Emergencies and How to Avoid and How to Meet Them. G. P. Putnam's Sons.

BERT: Primer of Scientific Knowledge. J. B. Lippincott and Company.

HOOKER: Child's Book of Nature, Part II. The American Book Company.

LOVEJOY: Nature in Verse. Silver, Burdett and Company.

NEWTON: Graded Games and Rhythmic Exercises. A. S. Barnes and Company.

CRAWFORD: Folk Dances and Games. A. S. Barnes and Company.

STONEROAD: Gymnastic Stories and Plays. D. C. Heath and Company.

One Hundred Gymnastic Games. Boston Normal School of Gymnastics.

POULSSON: Finger Plays. The Lothrop, Lee and Shepard Company.

ABEL: Prize Essay — The Five Food Principles with Practical Recipes. American Public Health Association.

All bulletins of the U. S. Department of Agriculture on the source, treatment, and cooking of food.

Grateful acknowledgment is due to many educators and scientists who kindly read and criticised the text of this book; to Houghton, Mifflin Company, The McClure Company, Doubleday, Page and Company for permission to use extracts from their books; and to the New York State College of Agriculture, Cornell University, for the loan of the illustration on page 172. I am also indebted to Mr. David C. Lithgow for nearly all the drawings that appear in this book.

E. B. H.

SOME LIVING THINGS

THE PLAYMATES

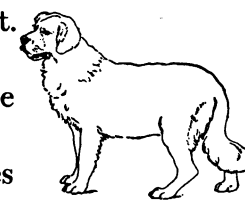
SOME LIVING THINGS

LESSON 1

CARLO AND THE ROCK

I LOOK out of the window, down into the school-yard, and see Carlo waiting for his little playmate; and at the corner of the yard I see a large rock.

Here are two objects that are not at all alike, because, you say, one is alive and the other is not. What do you mean by "alive"?



Study Carlo and the rock and find out some of the differences between the two.

I open the window and whistle. What does Carlo do? Can the rock move from its place?

Write a statement telling one thing that Carlo can do that the rock cannot do.

A dog was dropped down the shaft of a mine. Two boys risked their lives to save it. There were two reasons why the dog could not live in the mine. What were they? What does Carlo need that the rock does not need?

Write three statements answering the last question.

Carlo was once a puppy — that was five years ago. Do you think he has changed any since then? Has the rock changed in the same way?

Write a statement telling how Carlo has changed.

Carlo barks, whines, and sometimes snaps. When does he bark? When does he whine? When does he snap? Does the rock ever *feel* hungry, lonely, or cross? Can you hurt the rock?

Write a statement telling another difference between the dog and the rock.

Is the body of the dog made up of different parts? Name some of them and tell their uses. Is the rock made up of different parts? In another lesson we shall learn whether other animals are as fortunate as the dog in having all the parts they need.

Write a statement that tells one more difference between the dog and the rock.

LESSON 2

OTHER ANIMALS BESIDES CARLO

Provide yourself with a blank-book.

In the margin of this page are drawings of different forms of animal life. Do you know the names of them all? Have you seen them? Tell something about each animal.

Write in your blank-book the names of twelve different kinds of animals, as follows:

1. An animal that stands erect, has two hands, and can think and talk. Is this the tallest animal? the largest? the strongest? the swiftest? And yet man is called the *highest* form of life. Why?
2. An animal that looks something like the highest form.
3. A four-footed animal.
4. A two-footed animal that flies.

5. An animal that has no limbs yet moves swiftly over the ground.
6. An animal that lives partly on land and partly in the water.
7. An animal that lives in the water and swims by means of fins.

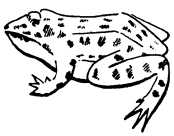
8. A six-footed animal.

9. An eight-footed animal.

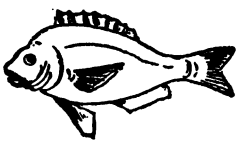
10. A ten-footed animal.

11. An animal that has a rough shell and lives in the water.

12. An animal that has no limbs and lives in the earth.



You know these animals and many others as quickly as you see them. You say you "know them by their looks and actions." Every kind of animal that you have named looks different from every other kind, and yet in some respects all animals are alike.



Answer the following questions about each animal that you have named:

1. Does it need food? What kind of food — plant or animal, or both?

2. Does it need air? Where do the fish and the earthworm get air?

3. Does it grow? Does it grow by taking food within its body?

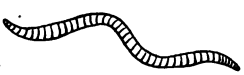
4. If you touch it, what does it do? Does it feel heat and cold? Has it feeling, then?

5. Can it move from place to place? If not, can it move some parts of its body? Does it move some parts in getting its food? Does not its body move as it grows?

Write five statements in your blank-book tell-

ing five facts that you have found true about all the animals that you named.

When you have written these statements, you have told facts that are true not only of man and the other forms of animal life that you know about, but of every animal that lives. If you study them all, you will find that they need food and air, that they grow, feel, and move some parts of their bodies. You will find, too, that animals are alike in having an instinct, or desire, to live. Can you tell how the squirrel, the robin, the bee, and other animals that you know, work in order that they may live, how they provide for their wants, and defend themselves from harm? The more we know about animals, their structure, needs, and manner of living, the more interesting they become to us, and the more sympathy, or fellow-feeling, we have for them in their "struggle for life."



Copy the following motto and tell what you think it means:

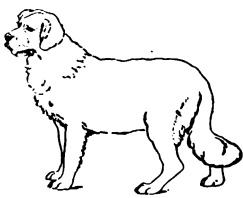
"LIVE AND LET LIVE."

Lesson 3

PLANTS

Name some other living things besides animals.

We found that animals, however much they might differ from one another in their looks and manner of living, were alike in several respects. The same may be true of plants and animals. The plants and animals that you know look very different from one another, and yet, in some things, they are very much alike.



Compare some animal that you know very well, as a dog, with some plant that is, perhaps, in your schoolroom, as a geranium. You can tell easily how they differ — that the dog jumps and runs and the plant is rooted to the soil; that the parts of the dog and the parts of the plant are not at all alike; that the dog has a covering of skin, and the plant a woody bark; that the dog eats meat and the plant gets its food from the soil and the air; that the dog knows a great deal and the plant is commonly said to know nothing. It is very plain that the dog and the plant are different, and yet you have already said that they are alike.

Answer the same questions about the plant that you asked about each animal:

1. Does it need food?
2. Does it need air?
3. Does it grow?
4. Has it feeling? Suppose you left it without water, or cut it badly, or poured something poisonous over it? Have you ever seen a sensitive plant? What is the meaning of "sensitive"? Why is this plant called sensitive?
5. Can the plant move from place to place? Do any parts of the plant move when the sun shines? when it is dark? when the buds open? when the plant grows?

Write five statements telling truths that you have found out about the plant. Do they tell the same truths that were told about the animals?

You have found, then, that the plant and the dog, in spite of their differences, are alike. They are both living things. They both need food, although their food is quite different; they both need air; they both grow by taking food within their bodies; they both have feeling, and in each there is some kind of movement.

When you come to study the tiny plants and animals that can be seen only with the aid of a microscope, you will find that there are some

of these plants so much like animals, and some of the animals so much like plants, that it is hard to tell which are plants and which are animals. They have no parts such as the plants and animals that you know, have. Some of the little plants swim about in the water like animals, and some of the little animals are rooted like plants, so that you cannot name these tiny living things either plants or animals so easily as you did the dog and the geranium. But they eat, breathe, grow, feel, and move, and therefore are alive, — although just what it means to be alive, no one as yet has been able to tell.

Commit the following to memory:

Flower in the crannied wall,
I pluck you out of the crannies,
Hold you here, root and all, in my hand,
Little flower; but if I could understand
What you are, root and all, and all in all,
I should know what God and man is.

TENNYSON.

PRINCIPAL PARTS

THE ATHLETE

THE FIVE PRINCIPAL PARTS

LESSON 4

THE OUTSIDE PARTS

THE bodies of the animals that you will study in this book are made up of definite parts, each part having a certain work to do. Such parts are called "organs." We shall study first the external, or outside parts, of the bodies of animals; then, in a simple way, the internal organs. We shall study the human body, not alone, but in relation with other living things and the things on which it depends for life. Thus we may come to know more and think more highly of all forms of life, including the highest form, man.

Look at the drawings of the animals in Lesson 2, and answer the following questions:

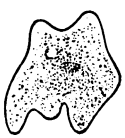
What are the five principal parts of the human body?

Have the bodies of other animals the same principal parts? Which of the five parts has the monkey? the cat? the bird? the snake?

the frog? the fish? the grasshopper? the spider? the crab? the oyster? the earthworm?

Write a statement about each drawing, telling the principal parts of each animal.

You find that some animals have five principal parts, some four, some three, some two, and some only one; that some have heads, trunks, necks, arms, and legs; that some have heads and trunks, but no limbs, as the snake; that some have trunks, limbs, and heads, but no necks, as the frog; and that some have neither limbs nor heads, as the oyster. If you look at the tiny animals that can be seen only by the aid of a microscope, you will find that they have no definite forms and parts such as the animals have that you have observed, yet every animal seems to have all the parts that it needs, and its life and work are suited to the parts that it has to work with. Man has five parts. It is not necessary for him to use all of them in order simply to live; but if he would live the most useful life, give the most to life, and get the most out of life that is possible, he must use all the parts in the best manner possible. This requires care and training of the principal parts of the body.



Good Health Club. — In the latter part of this text-book, you will find a blank page such

as is to be used by the "Good Health Club." Your teacher will tell you about forming this club.[1] In the back part of your blank-book, write at the top of a page the name of the club, and underneath the title this motto:

"As I wish to be healthy, happy, and useful, I will try to keep the following rules":

As you study the lessons in this book, you, with your teacher, will discover rules that you ought to follow, if you want to be clean, healthy, happy, and useful. Such of these rules as you are willing to *try* to follow, you are to write on the pages of your blank-book, underneath the motto, numbering them 1, 2, 3, etc.

Record of Growth. — On the last page of this text-book you will find a ruled blank page that is headed "Record of Growth." Rule in the same manner a page in your blank-book. Find out your weight and make the measurements that are called for, and enter the results at the times named, in their proper places.

[1] See directions on page x. (To the Teacher.)

THE LIMBS

Lesson 5

MOTION FROM PLACE TO PLACE

Look out of the window and notice whether anything is moving or not. The leaves are flying along the street. What moves them? You see an automobile — what moves it? Off in the distance is a long train of cars — what moves it? People, horses, dogs, birds, are all moving. What moves them? We think that the automobile and the engine are wonderful pieces of machinery, but is not your own little body that can jump up and run hither and thither wherever it likes, or the body of any lower animal, of even the tiniest insect, that moves of itself from place to place, far more wonderful than any machine?

Observe for one day living animals and tell by what means they move from place to place.

Draw pictures, or clip and mount them, in your blank-book, of the following:

1. An animal that stands erect and moves by means of two legs;

2. Animals that can move by means of two legs, but have also other means of moving from place to place;

3. An animal that moves by means of four legs;

4. An animal that moves by means of six legs;

5. An animal that moves in the water by means of ten legs;

6. An animal that moves by means of thirty or more legs.

7. An animal that moves by means of one foot;

8. An animal that moves in the water by other means than legs;

9. An animal that moves very swiftly, but has no legs, wings, or fins.

Write one statement about each picture, telling how each animal is able to move from place to place.

Find a word that means "motion from place to place."

Lesson 6

THE ARMS OR FRONT LIMBS

You found that some animals use the front limbs, some the hind limbs, and some both in moving from place to place. Let us find other uses of the arms, or front limbs, of animals besides the use for locomotion.

Observe for one day the front limbs of lower animals. Notice how they are placed, their shape, length, and strength, the different kinds of work that they do, and whether they are suited to their work. Then make drawings and answer questions about the front limbs of animals, as follows, and write the answers as statements in your blank-book.

Draw the front limbs of a horse. What are they called? What are the two principal uses of the forelegs of the horse? How are they suited to this work? Are they long, strong, and straight? In what do they end?

Draw the front limbs of a dog or cat. Name three uses of the forelegs of a dog. How are they suited to their work? Describe them. In what do they end?

Draw the front limbs of a squirrel. What

work do they do? Name four uses of the front limbs of a squirrel. Describe a squirrel's front limb, including the hand part.

Draw the front limb of a bird. What is it called? Watch its use by different kinds of birds.

Look at a feather carefully. Notice the quill and the plume — how light and strong they are, and how the fine parts of the plume, called "barbs," are held together by little hooks.

Name a bird that has small wings in proportion to its body; one that has large, strong wings; one that has long, pointed wings.

Find the front limbs of a fish. What are they called? What is their use? Where are they placed and how do they move? Draw the front limb of a fish.

Show by drawings five different endings of front limbs.

Lesson 7

THE PARTS OF THE ARMS

Draw in your blank-book the arm of man.

In what does it end?

Begin at the shoulder and name the parts of the arm. At the right of each part in the drawing, write the name—shoulder, arm, elbow, forearm, wrist, hand.

In what directions can the shoulder-joint move? The elbow? The wrist?

Notice that when your arm hangs naturally from the shoulder, if the elbow bends, it points backward, while the wrist in bending points forward.

Draw the forelimb of a horse. Find the elbow of the horse (joint pointing backward), the upper arm, shoulder, forearm, wrist, hand, and finger parts. Does a horse walk upon its hand or its finger parts? The wrist joint of the horse is commonly called the "knee"; the joint between the hand and the finger parts, the "fetlock-joint." Write in your blank-book the names of the parts of the forelimb of a horse, and connect each part in the drawing with its name by means of dotted lines.

Find the pictures of animals that walk on the hand parts of their forelimbs.

Draw a human hand — your hand.

Point to the parts of the hand and fingers and name them — back, palm, sides, fingers, thumb, ball of the thumb, tips of the fingers, knuckles, nails.

Name the fingers — fore, or index; middle; third, or ring; and little. Why is the index finger so named? Can you move the thumb so as to touch every finger with it? If you could not move the thumb in this manner, the hand could not do the work that it now does.

Find a picture of a monkey. Notice the length of its front limbs. Draw the arm of a monkey. Name the parts of the arm. Has the hand part a thumb? Is it like the thumb of man?

Write in your blank-book the names of the parts of the hand and the names of the fingers.

Lesson 8

THE BONES OF THE ARM AND HAND

What gives your arm and hand their shape?

Can you feel the hard part in the arm and hand?

What is this hard part, or the framework, called?

Look at the drawing of the bones, or the skeleton, of the arm and the hand, and tell — the number of bones in the upper arm; the number of bones in the lower arm. Are the bones of the lower arm fastened to the wrist-bones?

Can you feel all these bones in your arm?

Rest your hand on the table. Turn your hand over. Does the bone on the thumb side or on the little finger side of the lower arm move with your hand?

Bend your wrist. Notice the curve. There are eight little bones in the wrist that allow it to bend easily and gracefully. Can you find these bones in the drawing?

Count the bones in the hand.

Count the bones in the fingers.

Has the thumb as many bones as the fingers have?

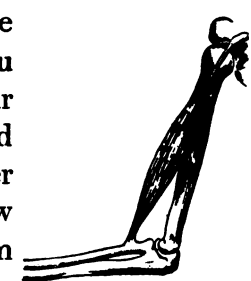
Get the skeleton of the wing of a fowl. Can you find in it the parts and some of the bones that are like the upper arm, the lower arm, and the bones in your arm? Can you find parts something like fingers?

Write five statements telling the number of bones in the arm, the forearm, the wrist, the hand, the fingers, and the thumb.

Lesson 9

THE MUSCLES OF THE ARM AND HAND

Feel of the fleshy parts of the arm. These parts are called "muscles." All lean meat is muscle. If you will look at the foreleg of an animal in the market or in your homes, you will find the bundles of meat or muscles arranged in neat layers. Some of the layers are large and some are small, some are thick and some thin. Some end in short, tough, flat cords and others in long, slender ones, by which the muscles are fastened to the bones. Every movement of your arm, and of your body, is made by muscles.



Grasp with the left hand the right arm above the elbow. Bend the forearm slowly. Do you feel the muscle on the upper or inner side of your arm grow larger? It shortens and thickens and brings the bones to which it is fastened nearer together. Straighten the arm. Notice how the muscle on the opposite side of the arm grows thicker. Lift a heavy weight from the floor. Which muscle grows thicker?

Place the fingers of one hand on the wrist of the opposite arm. Move the hand and fingers

of that arm. Do you feel the cords in the wrist? Do you feel them in the back of the hand when the fingers move?

The thick parts of the muscles that move the fingers are in the forearm. Is it not a neat arrangement to have slender cords; rather than thick muscles, in the wrist and hand?

Notice how freely the arm can move at the shoulder-joint.

Which can move more swiftly, the arm or the fingers?

Which can lift the heavier weights, the arm or the fingers?

Write four statements about the fleshy parts of the arm: one telling the name of the fleshy parts; one telling their use; one telling where the strongest muscles of the arm are; and one telling where the muscles are that move most quickly.

LESSON 10

THE WORK OF THE HANDS

Name, and write about:

Kinds of work that need strong hands;

Kinds of work that need quick, trained hands;

Kinds of work that need soft, sensitive hands.

Tell how hands can be made strong; how they

can be made quick and steady; how they can be made soft and sensitive.

The hands play an important part in the world's work. They should be trained and cared for so that they can do their best work. Good health, cleanliness, and training will give the hands their highest value. The hands are for work, and no one should shirk work for the sake of sparing the hands, but no one should hesitate to protect them whenever it is possible. "I have eyes in the tips of my fingers," a dentist said. What did he mean? How do you think his hands looked, and how do you think he cared for them?

The hands that are suited to their work and do it well are the hands that we all respect and admire.

Copy and commit to memory the following stanza:

"Beautiful hands are those that do
Work that is honest, brave, and true,
Moment by moment the long day through."

Read the following:

THE MEANING OF THE HAND

Look where we will, we find the hand in time and history, working, building, and inventing. The mechanic's

hand, the hand that hews, saws, cuts, builds, is useful in the world equally with the delicate hand that paints a wild flower or moulds a Grecian urn, or the hand of a statesman that writes a law. The eye cannot say to the hand, "I have no need of thee." Blessed be the hand! Thrice blessed be the hands that work!—*Selected.*

Lesson 11

THE CARE OF THE HANDS

You can tell a great deal about a person by the looks of his hands and nails. One cannot begin too early to care for them.

The hands need to be washed very often. Name times when you think they will need washing. It is a clean and restful practice, as one is working, to plunge the hands often into water and then thoroughly dry them.

If the hands are very grimy they should be washed in warm water to which a little pearline or ammonia has been added. Good soap should be used and the hands rinsed thoroughly. At bedtime it is a good plan to wash the hands in water to which a little oatmeal has been added, or, after the hands have been washed and dried, they may be rubbed with dry oatmeal.

The nails should be cleaned at least once a

day in one's own room or home and never in a public place. For this purpose every one should be provided with a nail-brush, a pair of nail-scissors or a penknife, and a nail-cleaner. After the hands have been thoroughly washed and the nails scrubbed, the skin around the edges of the nails should be carefully pushed back with a blunt edge and the free edges of the nails should be trimmed as smoothly as possible and cleaned with a dull edge — not scraped with a sharp knife or scissors.

Write on the Good Health Club pages four rules relating to the care of the hands:

1. *I will wash my hands on rising in the morning.*
2. *I will wash my hands before going to bed at night.*
3. *I will wash my hands before eating.*
4. *I will clean my nails at least once a day.*

Can we not write one more rule? We not only want clean hands, but we want steady, skilful hands. In order to have them we must let those things alone that steal away the cunning of the hand. A boy who uses cigarets is less likely to become a famous architect or artist than if he did not smoke. Ask him to draw a clean, straight line. Notice whether he writes a

firm, plain hand. Notice, too, the appearance of his hands and nails. Are they clean, pink, and white? Bookkeepers who smoke are often rejected because of their tremulous handwriting. The hands of dentists, surgeons, and other classes of people that were noted at first for their quickness and skill, have been known to become clumsy and uncertain in their movements because of the excessive use of tobacco. A growing boy who indulges in cigaret smoking cannot hope to succeed in any work that calls for skilled handiwork. A boy who expects to win a place in any trade, art, or profession will willingly write this rule:

5. *I will not use tobacco in any form.*

A STORY TOLD BY THE ARMS AND HANDS

If the hands and nails are clean you may, by means of the hands and arms principally, tell a story without using any words. The story is told in a few lines, but with the help of your teacher you are to learn to tell it by movements of your hands and arms and other parts of your body. It may take days or weeks before you can tell the story from beginning to end correctly and clearly. As you make the motions, try to forget yourself and everybody else

who may be watching you, and be a fish, or a bird, or a sailor, as the case may be, and then your hands and arms will work freely and gracefully.

A BEACH PARTY

[1] SOME boys and girls went down to the bay for a picnic on the beach. On reaching the water they were greatly interested in the little [2] fishes which they saw near the shore, and in the [3] sea-gulls that were flying about over the water. The children [4] picked up shells and pebbles from the beach and [5] dug in the sand. Then they put on their bathing-suits and went in bathing and [6] swimming. After lunch they all got into a large rowboat and [7] rowed until they were tired. A small sail was [8] hoisted and they sailed until it was time to return home. On reaching the landing a rope was [9] thrown ashore and the boat was made fast. Then they all [10] skipped merrily home.

1. Walking. — Pupils walk easily and naturally several times around the room, then back to their places in the aisle.

2. Movements of the fish. — Bring the palms of the hands together, fingers pointing forward, wrists drawn back to the chest. Extend the

arms forward quickly, making a wavy movement. Repeat four or more times.

3. Movements of the gulls. — Extend the arms at the side and let them slowly rise and fall, carrying the hands loosely, the wrists leading.

4. Picking up shells. — Kneel on the right knee, placing the left foot forward. Pick up shells and pebbles with the right hand, and drop them into a pail held in the left.

5. Shovelling. — Drop on both knees and move the arms as if shovelling with a small shovel.

6. Swimming. — Extend the arms forward, palms together, right foot forward, trunk leaning forward. Move the arms slowly outward, backward, and forward, making a circle, as in swimming. Breathe a deep breath as the arms are brought backward.

7. Rowing. — With the hands clasping oars make a movement as if rowing.

8. Hoisting a sail. — Close both hands tightly as if seizing a rope, raise both hands high, one above the other, move the arms down quickly and vigorously as if pulling a rope and hoisting a sail.

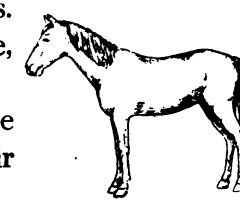
9. Throwing a rope. — Bend the left forearm as if it held a coil of rope, grasp the rope with the right hand and make a swaying movement side-

wise three times as if getting ready to throw the coil. At the fourth count throw the rope, leaping on the right foot, the right arm extended. Sink back on the left foot without losing the balance.

10. Skipping. — Pupils skip lightly around the room several times.

Lesson 12

THE LEGS OR HIND LIMBS



Observe for one day the hind limbs of animals. Notice how they are placed, their shape, size, strength, and movements.

Name animals that run swiftly. Which are the larger and stronger, their front limbs or their hind limbs?

Name animals that leap. What differences do you notice between the front limbs and the hind limbs of these animals?

The hind limbs of four-footed animals are used mainly for pushing the body forward, and are, therefore, much stronger than the front limbs, which are used chiefly for supporting the fore part of the body.

Name five or six different uses that different birds make of their legs. Name a bird that hops;

one that walks and runs; one that scratches; one that paddles; one that perches; one that tears its food. Describe the feet of each.

Name different uses of the legs of man. Are they larger and stronger than the arms? Why? Have they the same number of parts as the arms?

Draw the leg of man. Write the name of each part and connect the name with the part by means of dotted lines — hip, thigh, knee, lower leg, calf, shin, ankle, and foot.

What movements can the hip joint make? Can it move as freely as the shoulder joint?

What are the movements of the knee joint? Are they the same as those of the elbow?

Can the ankle move as freely as the wrist?

Notice that the ankle in bending points backward and the knee forward. This fact will help you in finding the same parts in the hind limbs of lower animals.

Draw the hind legs of a horse and show, by writing the names, which parts are like the parts of the leg of man.

Draw the hind leg of a bear and write the names of the parts.

Draw the leg of a bird and write the names of the parts.

Observe animals, and notice whether they walk on their toes or on the sole parts of their feet.

The legs and the feet of animals differ according to the work that they have to do. Some animals run very swiftly, others make long leaps, others climb, and others swim by means of their limbs. As a rule the lower animals can make one or two movements very well indeed, better than man can make them, but they cannot make the great variety of movements that man can make.

Lesson 13

THE BONES OF THE LEG

Look at the drawing of the skeleton of the leg.

Find the longest bone in the leg. Name it "thigh bone." Its upper end is fastened to a strong, irregular bone, called the "hip bone." To what is the lower end of the thigh bone fastened? In man the thigh bone is the longest bone in the body. Find out whether this bone is the longest in the leg of a fowl and in the hind legs of four-footed animals.

How many bones are there in the lower leg of

man? Is the larger bone on the inner or on the outer side of the leg? The larger bone is called the "shin bone." Can you feel the sharp ridge along the front part of it?

Straighten one of your legs so that the heel rests on the floor. You can then move easily with your fingers a little bone that is over the knee joint. This bone is called the "kneecap."

Do the three long bones of the leg correspond in their position with the three long bones of the arm?

Are the bones of the leg larger and heavier than those of the arm? Why is this true?

Write four statements, two telling the number of bones in the upper and in the lower parts of the leg, and two comparing the bones of the arm and of the leg.

Lesson 14

THE MUSCLES OF THE LEG

Get the leg of a fowl. Remove the skin. You can easily find the separate bundles of meat, or the muscles.

Notice the tough cords, or the "tendons," by which the muscles are fastened to the bones.

If you were to remove the muscles carefully,

one by one, you would find them arranged in groups or layers, and quite distinct from one another.

If, before removing the muscles, you were to pull the different cords that pass down into the toes of the fowl, you would find that one set of cords on the sole of the foot bent the toes, another set on the upper side straightened them, while the muscles to which they are fastened are in the lower leg, or the "drumstick."

Study the drawing of the muscles of the human leg and notice the same nice arrangement of the muscles in layers, and the cords that pass down into the feet.

If you could watch the muscles at work in the leg of man you would find them arranged also in pairs, one muscle on the front of the leg causing a certain movement, and another on the back causing an opposite movement.

As one boy rises on the toes let another feel the muscle that pulls the heel up and lifts the body.

Move the toes. Can you feel in the lower leg the muscles that bend and straighten the toes?

Name movements that can be made by the legs and feet. All these movements are made by the action of the muscles. Sometimes only

one muscle acts, but usually several muscles act together.

Write several statements about the muscles: one telling about their shape and the cords, or tendons; one telling how the muscles are arranged; and one or more telling how they act.

LESSON 15

THE HUMAN FOOT

Observe, if possible, with your teacher, a good plaster cast of the human foot.

When you take off your shoes at night study your feet.

Place your foot on a piece of paper and draw a line around it.

Make a drawing of the human foot.

Write the names of the parts of the foot and connect the names with the parts by means of dotted lines — sole, ball, heel, ankle, arch, instep, toes, joints.

Observe the hand and find the parts that correspond with the parts of the foot.

Which side of the foot is curved, the outside or the inside? Which side is straight?

Which side of the sole is arched? Which is flat?

Which side of the ankle joint is higher, the outside or the inside?

Which side of the foot has the great toe? Is it in a straight line with that side of the foot?

Which part of the sole spreads as it bears the weight of the body?

Tell, then, how the sole of a shoe should be shaped — should the inside be curved or straight? the outside? Which should be the broader, the heel or the ball?

Write a description of the shape of the human foot.

Lesson 16

THE FEET AND THE SHOES

Observe how the toes act when the feet are bare.

If the feet were free to move in a natural manner, the toes, and not the heel, might touch the ground first in walking. The toes are sensitive, and when the feet are bare, by touching the ground first they act as "feelers" to find out whether the footing is safe or not. If the toes touch a sharp object the foot can be quickly drawn back. Can the toes act naturally in stiff, tight-fitting shoes?

Observe the feet when standing. Which toe bears the greater part of the weight of the body? How does it act when it bears the weight?—Does it spread away from the other toes? Notice the other toes, how they press upon the ground when they bear a weight. Do narrow or pointed-toed shoes allow the toes to act in this manner? What should be the shape of the toes of shoes?

Look at the drawing of the skeleton of the foot. Can you find seven bones in the ankle? These bones allow the foot to move very freely, but not so freely as the wrist moves. How many bones between the ankle and the toes? How many bones in the great toe? How many bones in the other toes?

If the shoes are narrow and tight and made of stiff leather that will not bend, will not the movements of all these little parts and joints of the foot be hindered?

The skin of the feet, like that of other parts, is full of little holes, or pores, from which moisture, or sweat, is all the time passing off. If the moisture is not allowed to escape, the feet become damp, cold, uncleanly, and unhealthy. The material of which shoes are made should be such as will allow the air to reach the feet and the moisture to pass away from them. Can you

name some good materials of which shoes should be made? Can you tell why rubber overshoes are not good for the feet and should be worn only when necessary to keep out the dampness?

Barefoot sandals are cool for the feet and allow children to go barefoot without exposing their feet to the danger of cuts and bruises.

The shoes, then, should be made to fit the feet and not the feet to fit the shoes. They should protect the feet like a second skin, and like the skin should be soft, flexible, and porous. (Find the meaning of "flexible" and "porous.") They should allow perfect freedom of movement. One should walk almost as easily, lightly, and gracefully with shoes on the feet as without them. If the shoes are thin, overshoes should be worn out of doors when the ground is cold or damp, but should be removed as soon as they are no longer needed.

Lesson 17

CORRECT USES OF THE LEGS AND FEET

As we study the different parts of the body let us learn their uses, and try to use the parts in the right manner. Name some of the uses of the leg and foot.

Practise the following:

Standing. — Stand with the heels about four inches apart; toes pointing forward; knees straight; hips firm; chest raised; chin in; arms at the sides; weight of the body thrown forward mainly on the balls of the feet, resting slightly on the heels. — G. H. C.[1]

Walking. — Stand properly and the manner of walking will take care of itself.

Running. — Lean slightly forward; close the mouth and breathe through the nose; bend the arms at the elbow, and run.

Jumping. — Bend the hips, knees, and ankles; jump; land on the toes and spring to an upright position.

Stooping. — Advance either foot and sink on the opposite knee, bending all the joints from the ankles to the neck.

Rising from a Chair. — Hold the trunk and head erect; step forward with the right foot, and backward with the left so that it rests on the toes; lift the body to a standing position, keeping the trunk erect.

Mounting Stairs. — Lift the chest, bend the trunk slightly forward, and walk, not run, up the stairs. — G. H. C.

[1] See page x (To The Teacher).

There are two more rules that should be adopted by the Good Health Club.

Ought not the feet to be as beautiful as the hands? In order that they may be, they should be cared for as well as the hands. How often are the hands washed and the finger nails trimmed? It may not be convenient to give the feet the same attention, but they should be kept clean, beautiful, and healthy. Remember that they are shut away all day from sunshine and pure air; that they are often most uncomfortably and unhealthfully dressed. Once a day they should have a sponge bath at least, preferably at night. Write, then, a rule that you are willing to try to follow, in regard to the care of the feet. — G. H. C.

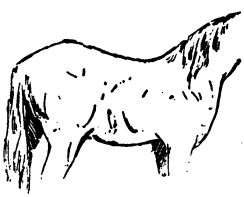
Remembering, too, that the foot is not a solid block, but full of parts and joints that have each a certain work to do, write a rule telling the kind of shoes that you will *try* to wear, that is, the kind that fit the feet and allow them to do their work comfortably. — G. H. C.

THE TRUNK

Lesson 18

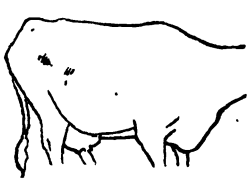
THE TRUNKS OF LOWER ANIMALS

Which part of a tree is called the trunk? Which part of an animal is called the trunk? What are the parts called that grow from the trunk of a tree? What are the parts called that grow from the trunk of an animal?



Do all animals have limbs? Do all animals have distinct heads? Do all animals have trunks? Into which part of the body are food and air received? Then which part of the body of an animal is the most important?

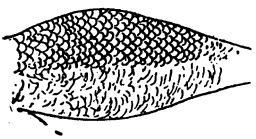
Observe for one day the trunks of animals. Notice their shapes, sizes, positions, and movements.



Observe in the same manner the trunks of the animals shown in Lesson 2.

Compare the trunks of the horse and the cow. Which has the larger trunk in proportion to the size of the animal? How do they differ

in shape? Which is the more curved? How are they both supported? Is the longest line of each of these trunks vertical, horizontal, or slanting?



Draw the trunks of the horse and the cow.

Draw the trunk of a bird. Is its longest line vertical, horizontal, or slanting?

Draw the trunk of a fish. Is its longest line vertical, horizontal, or slanting?

Can you name a lower animal that naturally holds its head and trunk erect, that is, in a vertical line?

Can you name animals that may be trained to hold their trunks erect?

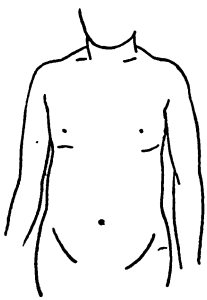
Draw the trunk of an insect. Notice the two parts of the trunk. Find out which part is called the "thorax" and which the "abdomen"?

Name animals whose trunks are stiff and unbending; whose trunks bend slightly; whose trunks bend easily and gracefully.

Write two statements about each of the trunks drawn: one, telling about its shape; the other, about its position and support.

Lesson 19

THE HUMAN TRUNK

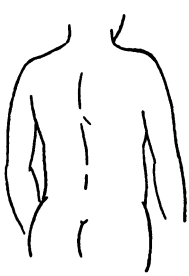


Draw a front and a back view of the trunk of man.

Write the name of each part of the trunk and connect the name with the part by means of dotted lines, — chest, abdomen, breast, sides, back, shoulders, waist, hips.

Observe the shape of the trunk. How is it supported? Is the longest line of the trunk vertical, horizontal, or slanting?

Bend the trunk forward, backward, and from side to side. Twist it. Can it bend easily at every point; that is, is it flexible?



The bone that supports the trunk like a pillar, or column, and yet allows it to bend in every direction, is called the "spine," or "back bone."

Feel on your back the ridges, or spines, that project from this bone. Observe them on the backs of other animals. Find out whether the back bone is made up of one bone or of many bones.

Look at the drawing of the back bone. Notice whether it is straight or curved. Can you find four curves in it? These curves act

as springs and prevent the head from feeling shocks or jars that might be felt from jumping or running.

Look at the two large bones that form the floor of the trunk. (See page 46.) What is their name? To what bones are they joined?

The back bone is used in standing, sitting erect, walking, stooping, rising, and in nearly every movement of the body. It would be of little use, however, without the aid of the muscles of the trunk. These are broad and thin and there are several layers of them. These muscles should be trained to hold the trunk erect and bend it easily in every direction.

Write six statements: two, describing the shape and the position of the trunk; three describing the back bone; and one, describing the hip bones.

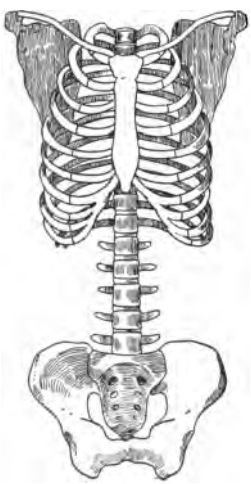
Lesson 20

THE USE OF THE TRUNK

Any part of the body that does a special kind of work is called an "organ." The hands or the feet may be called organs, but the name is given more especially to the parts that are within the body.

The use of the trunk is to hold and protect some of the most important organs of the body. The organs that receive the air, and the organs that receive the food, prepare it, and send it over the body, are in the trunk.

You saw that the trunk of an insect was made up of two parts, called the thorax and the abdomen. In man and in many other animals, as in the monkey, dog, horse, and other mammals (find the meaning of "mammal"), the trunk is composed of two parts, — the thorax, or chest, and the abdomen. These two parts are as distinct as in the insect, except that the division between them does not show on the outside of the trunk. On the inside there is a strong, tight, muscular partition that separates the two parts. Can you see on a chart or in the drawing where this partition, called the "diaphragm," is placed?



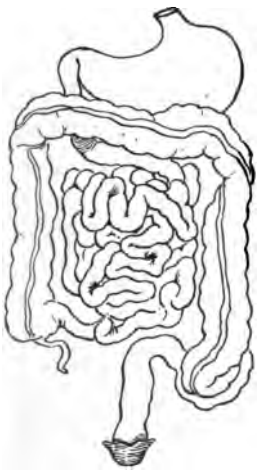
Feel of the walls of your chest — are they hard or soft? What is the name of the bones that you feel on the sides of the chest? Look at the drawing and tell what bone they are fastened to at the back. How many ribs can you count on each side? These bones form a bony cage. In front, the first seven pairs are fastened by means of gristle, or "cartilage," to a bone, the "breast bone" and are called "true ribs"; the next three

pairs are fastened to one another and then to the seventh rib, and are called "false ribs"; the last two pairs are not fastened in front to any bone, and are called "floating ribs." Observe the two flat, triangular bones, called "shoulder-blades," outside the ribs, and the two slender bones, called "collar bones," by which the shoulder-blades are joined to the breast bone.

Breathe in and breathe out. Does the chest change its shape and size? What causes it to change in this manner? What are the organs called that receive the air? Notice in the drawing how they are placed in the chest. (See page 118.) What is the organ called that sends the blood over the body? Notice its position between the lungs.

The heart and the lungs are well protected. In order to show them as they are shown in the drawing, there must be removed first, skin; then, muscle; then, ribs and breast bone; and lastly, a double inner covering.

Observe the walls of the abdomen. Are they hard or soft? Which parts of the abdomen are protected by bones? The organs that receive the food and prepare it for the body are in the abdomen. The principal ones are the stomach, the bowels, or intestines, the pancreas, and the



liver. Can you find some of these organs in the drawing?

Write five statements: one, telling about the two parts of the trunk; two, naming the organs of the chest and describing their protection; and two, naming the organs of the abdomen and describing their protection.

Lesson 21

THE CARE OF THE TRUNK

Look at the drawing of the bones of the trunk and tell which part of the chest is the larger, the upper or the lower part. If the lower part is naturally the larger, is it wise to try by means of tight lacing to change its shape and make it the smaller?

If the walls of the front part of the abdomen are soft and have no bony protection, is it wise to wear stiff, hard, tight clothing, like a corset, on this part of the body?

Will not the heart, lungs, stomach, and other organs in the trunk have to work very much harder if they are bound by tight clothing?

Can the trunk bend quickly and gracefully, can one work or play well if all parts of the trunk are not allowed to move freely?

The clothing, then, should protect the trunk,

but should not hinder it in its movements or the organs in their work. — G. H. C.

Different parts of the trunk are to be carried in different positions. Remember the chest is to be held high; the shoulders, down and back; and the hips back. — G. H. C.

Notice how the trunk is carried in an erect figure. A vertical line passing through the centre of the hip will pass through the centre of the head and in front of the ankle joint.

Man is the only animal that holds his trunk perfectly erect, or rather, that can hold it erect. Do you always hold your trunk in this manner? Observe the men and women that hold the chest high, the shoulders back, and the hips back. Do they not look like healthy, happy, successful men and women?

The trunk needs frequent bathing. Every healthy man, woman, and child should take a quick, morning bath all over. After the morning bath a person is at his best. He looks clean; he feels more respect for himself and can more easily command the respect of others; he is strong and ready for work, and stronger, too, to resist wrong and do right. The morning bath pays. It can be taken very easily. It is not necessary

to have a bathroom and a bathtub, a sponge and turkish towel, although these things are helpful. One should use whatever is at hand or can be obtained without troubling others. Every child should try to have his own toilet articles, such as basin, soap, wash-cloth and towel, brush, comb, tooth-brush, and nail-brush. All that is necessary for the daily bath is a basin of water, a wash-cloth, a towel, and from three to five minutes of time. Plunge the hands or the wash-cloth into the water, quickly wet the body all over, and dry it with the towel.

Try for one week to take the all-over bath every morning. At the end of that time I think you will be willing to continue the practice. — G. H. C.

All the organs of the trunk, in order to be healthy, need pure air, plenty of work and play, rest and sleep, and good food and healthful drinks. Articles of food or drink that we know are hurtful or that we have doubt about should be let alone. What is done in youth counts heavily for health and strength in after years.

Commit to memory the following stanzas from "The Builders."

In the elder days of art,
Builders wrought with greatest care
Each minute and unseen part;
For the gods see everywhere.

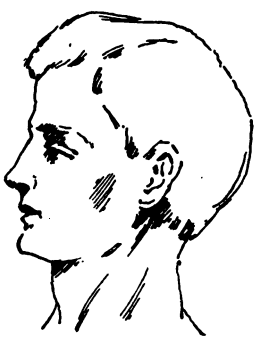
Let us do our work as well,
Both the unseen and the seen;
Make the house, where gods may dwell,
Beautiful, entire, and clean.

LONGFELLOW.

THE HEAD AND THE NECK

Lesson 22

HEADS AND NECKS OF LOWER ANIMALS AND OF MAN



Observe for one day the heads of all the animals that you chance to see.

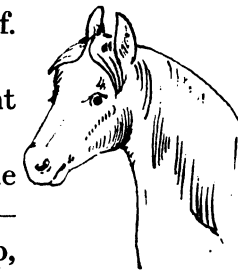
Can you find an animal or think of one that has no distinct head?

Draw the heads of some of the animals that you have observed, and write statements answering the following questions about each animal:

Where is the head placed? Are the head and the trunk in a vertical, horizontal, or slanting line? What is the shape of the head? Are its walls very hard? With what is the outside covered? Is the fur or the plumage on the head finer or coarser than that on other parts of the body?

Observe the human head. Draw a straight line showing the position of the head in relation to the trunk. What is its shape? Where is the

broadest part? Feel of its strong dome-like roof. With what is it covered?



Draw a side-view of the human head; front view; back view; top view.

Write the name of each part and connect the name with the part by means of dotted lines, — face, crown, back, sides, forehead, temples, scalp, hair, cheeks, chin, ears, eyes, nose, mouth.

Find some of these parts on the heads of lower animals.

How is the human head joined to the trunk? Notice how nicely the head is balanced on top of the back bone. Turn your head in several different directions.

Name the parts of the neck and write the names, — throat, nape, sides.

Observe the movements of the heads of different animals. Name animals that have necks; name some that have no necks. Name an animal that has a long, slender neck; one that has a short, thick neck; one whose neck arches over; one whose neck dips under; one that has a mane; one that has a dewlap.

Write a description of the human head and neck.

LESSON 23

THE USES OF THE HUMAN HEAD

Name the parts of the head through which air enters the body. Name the part through which food is received into the body. The head, then, is the "receiving office" for air and food. Let us find out whether anything else is received through different parts of the head.

Light enters the eyes and we see. Sounds enter the ears and we hear. Odors enter the nose and we smell. Food enters the mouth and we taste.

What do you know about things by seeing them? What do you know about things by listening to them? What do you know about things by smelling of them? What do you know about things by tasting them? Then all that you know that comes from seeing, hearing, smelling, and tasting, comes to you through parts of the head.

Think about something that you cannot see. Describe it. Think about something that you like very much. Wish for it. Try to get it.

The part of you that knows, remembers, likes, wishes, and makes you act in a certain manner,

is called the "mind." In all its work the mind uses a part of the body that is inside the head. What is that part called?

Write three statements telling about the most important uses of some parts of the head.

LESSON 24

THE HUMAN BRAIN

Look at the drawings of the brain on this and the following page and find the parts called the "great brain," or "cerebrum," and the "little brain," or "cerebellum." Into how many parts are they each divided? Does the surface look as though it were smooth or wrinkled? An English walnut with its two parts and wrinkled surface looks quite like the great brain. And as the walnut fits into the hard shell and is protected by it, so the brain is held and protected by the hard bones of the skull.

Study the bony covering of the brain. Notice that its shape is oval; that it is broader behind than in front; that the bone is very hard. Notice the seams, or the joints, shown in the drawing of the top of the skull. Are these joints movable? What does a carpenter call

this method of joining? Find out why it is better to have these joints rather than one solid bone. There is one movable joint in the head. Where is it? Notice the growth of hair and the thick skin that cover the scalp. How do some of these facts that you have observed about the skull prove that the brain is well protected? If you were to study the inside of the skull you would find that delicate coverings and a fluid further protected it.

Observe in the picture the large white cord that extends from the brain down into the back bone, or spinal column. This cord is called the "spinal cord." Smaller white cords, called "nerves," extend from the brain and the spinal cord to different parts of the body. It is through the nerves that messages are sent to the brain from all parts of the body, and from the brain to all parts. The nerves that run from the eye to the brain bring messages of light and of wonderful sights; the nerves that run to the ear, messages of sound; to the nose, of odors; to the mouth, of taste. If you touch anything that is hot, quick as a flash, the message telling of heat goes over the nerves to the brain, and quick as a flash, a message goes back to the muscles that move your fingers away from the heat. Every

movement that you make, every breath that you draw, every beat of your heart, every wink of your eyes can be made only by the aid of the nerves and the brain or the spinal cord. Thus you see how important these parts of the body are, and how important it is that they should be kept in good working order.

Write three statements describing the brain; three, describing the skull; two, describing the spinal cord and the nerves; two, describing the work of the nerves.

Lesson 25

THE CARE OF THE PARTS OF THE HEAD

The face should be washed with cold water, and rubbed well with the hands every morning on rising. This bath should include the neck and every part of the face, — eyes, ears, nose, and mouth. — G. H. C.

At night, after the day's work or play, warm water should be used, a little soap of the best kind, if necessary, a soft wash-cloth — some prefer woollen — and a soft towel. — G. H. C.

The hair should be brushed thoroughly every night and morning. — G. H. C.

The hair of young children should be washed once every week, at least. Children should learn to do this without any help. Even little girls having long hair should learn to wash their hair in an easy, simple manner.

Directions. — 1. Have ready a large wash-bowl nearly full of water that is almost hot and in which some good soap has been dissolved, preferably castile or tar soap. 2. Wet the hair thoroughly. 3. Rub the hair and scalp with the ends of the fingers, or with a small bit of cloth put over the ends of the forefingers. 4. Have at hand warm water and cold for rinsing. When the scalp is quite clean, rinse the hair with warm water and then with colder, until finally the water is quite cold. 5. If the hair is long, squeeze the water from it, shampoo the scalp with a towel, and shake out the hair over the shoulders to dry. 6. If the weather is warm, dry the hair in the open air. Short hair may be washed in the same manner. — G. H. C.

The brain, as well as other parts of the body, needs pure air, nourishing food, healthful drinks, plenty of work and play, and sound sleep.

Write about three kinds of work that call especially for a sound brain and steady nerves.

LESSON 26

TWO FOES OF THE BRAIN

SINCE the brain and the nerves control every part of the body, whatever affects the brain and the nerves has an effect for good or for ill on every other part.

The brain and the nerves, especially of young people, are very sensitive to the use of alcoholic drinks and tobacco. All the senses of the boy that uses them become dull. He cannot see, hear, smell, taste, or feel as quickly and correctly as if he did not use them. Those splendid servants of his, the brain and the nerves, are not in good working order, his mind cannot decide quickly and clearly, and every part of his body fails to do its best work.

Principals of schools, knowing that a boy smokes, have no need to look at the records in order to know that his standing is low.

Dr. W. T. Harris, formerly United States Commissioner of Education, has said that there is no other habit that so surely takes away from boys their manliness and virtue as does the habit of smoking.

Superintendents of railways have made it a

rule that employees of their roads are not to smoke cigarets. One railroad superintendent said: "Under no circumstances will I hire a man who smokes cigarets. He is as dangerous on the front of a motor as the man who drinks. His nerves are bound to give way at a critical moment."

The number of large business firms who will not employ men who smoke cigarets is increasing every year. One of the largest firms in the United States provided for its employees a course of lectures on the evils of cigaret smoking. Business men want the best service that can be given them, from the cash boy to the bookkeeper. They claim that cigaret smoking injures the health, weakens the memory and the sense of honesty, and in other ways unfits a man for business.

Boys who expect to secure good positions, must prepare for them. Good habits and success usually go hand in hand.

The reading lesson on the following page illustrates the work of one of the foes.

A Reading Lesson

THE WRECK OF THE "CLARA EM"

The fog, which is shy of a gale, had not yet come in, and the vessel could be plainly seen. She lay upon the reef broadside to the breakers; she did not pitch, but to a nautical eye, her air of repose was the bad thing about her. She was plainly held fast. Her red port-light, still burning, showed as each wave went down, and the gray outlines of her rigging could be seen. Her foremast had broken off about five feet from the deck, and the spar, held by the rigging, was ramming the sides of the vessel.

The astonishing rumor was true. The "Clara Em" — one of the famous fishermen of which Windover was too proud to be vain; the "Clara Em," newly built and nobly furnished, none of your old-time schooners, clumsy of hulk and rotten of timbers, but the fastest runner on the coast, the stanchest keel that cleft the harbor, fine in her lines as a yacht, and firm in her beams as an ocean steamer; the "Clara Em," fearing neither gods nor men nor weather, and bound for Georges' on a three weeks' fresh-fishing trip, had weighed anchor in the teeth of a March southeaster, and had flung all her

green-white sails to the gale. As nearly as could be made out from the shore she had every stitch up, and not a reef to her face, and she lay over against the rock like a great eagle whose wings were broken.

[Then the story tells how the crew were rescued from the wreck and how the young man, Bayard, risked his life to save them. As he was recovering from a long illness caused by the exposure, he begged an old captain to tell him how it all happened.]

"Just one more question, Cap'n Hap! What was it — exactly — that those men did? How did they come to be in such a plight? How in the world — that beautiful new boat — and an intelligent officer at the helm, Captain, — how on earth did it come about?"

"The crew were all drunk, every mother's son of them," replied Captain Hap. "Cap'n Joe was the only sober soul aboard, and that's the truth, and he knew it when he set sail. Yes, oh, yes. The storm was coming. He knew it was breezing up. Oh, yes, of course. So he got some sober men off the wharves to help him at the sheets, and he put up every stitch. Yes, sir! Every stitch he had! And out he sailed — with thirteen drunken men aboard — himself at

the wheel, and not a hand to help him. He drove right out of the harbor, and it was a sou'easter, and blew quite a breeze o' wind, and you see he tacked, and set in, and he was tacking out, and it had breezed up considerably more than he expected. So he drove right on the reef. That's about it."

"But why didn't he take in sail?"

"How was he going to do it with that crew? Why, he couldn't leave the wheel to tie a reef-point."

"But there was his anchor."

"Did you ever try to heave one of those big anchors? It takes four men."

"What a situation! Horrible! Can the boat be raised? Will she ever be good for anything?"

"Kindling wood," said the Captain dryly.

"Captain Hap," asked Bayard, "do things like this often happen?"

"Sometimes."

"Isn't this an extreme case?"

"Well, it don't happen every day."

"But things of this kind — do they occur often? Do you know of other cases?"

"Windover don't have them all," said Captain Hap. "There was the 'Daredevil' over on the South Shore. She was launched about a year

ago. She went on a trial spin one day, and everybody aboard was pretty jolly. They put all her canvas up to show her off. It was a nor'wester that day, and they drove her right before the wind. She just plunged bows down, and drove straight to the bottom. Some said it was her name, but it was rum that did it."[1]

[1] Adapted from "A Singular Life," Elizabeth Stuart Phelps. By permission of Messrs. Houghton, Mifflin & Co.

THE ORGANS OF SPECIAL SENSE AND OF SPEECH

HELEN KELLER AND "PHIZ"

THE SKIN

LESSON 27

THE SENSE OF TOUCH

Close your eyes and describe as correctly and as quickly as possible different objects that some one will put into your hands. Tell the following about each object: the material of which it is made; the shape; the size; the parts; the surface — whether smooth or rough; the temperature; the probable use; and the name.

Write a description of one of the objects "seen with the tips of the fingers."

Hold two objects that can be easily handled, one in the right hand and the other in the left. Compare the two objects in regard to material, shape, size, surface, and temperature.

Place on the table tiny bits of paper, thread, small beads, grains of sand, and other very small objects. Try to find and name these objects by the sense of touch.

Have you ever seen a blind person read? Can you tell how he is able to read? Find out, if

you can, about the story of Nydia, the blind girl of Pompeii — how, when the city was being destroyed, she was able to lead those that could see to a place of safety.

What advantage is it to any one to have a fine sense of touch? Name different kinds of work in which it is an advantage.

Rub a piece of cloth or the wood part of your lead pencil over the tips of your fingers; your lips; your cheek; your forehead. Which part is the most sensitive to touch? Which part felt a slight roughness on the smooth surface of the pencil?

Open a pair of scissors so that the points are about an inch apart. Lay the points on the back of your neck and on your cheek. On which part is only one point of the scissors felt? Open the scissors so that the points are about one-half inch apart. Lay the points on your cheek and on your forehead. On which part are the two points felt? Just separate the two points of the scissors and lay them on your forehead, your lips, and the tip of your finger. Are the two points felt distinctly?

The tiny nerves that end in the skin carry to the brain and the spinal cord the messages of touch. The skin of some parts of the body has

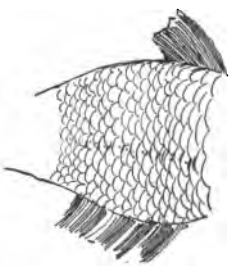
more nerves, or better trained ones, to receive these messages, than the skin of other parts. Can you explain, then, why, in the experiment with the scissors, you sometimes felt two points and sometimes only one point?

Write a description of the experiment with the scissors and tell which parts you compared, and which were found more sensitive than others.

Most animals have some one part of the body more sensitive to touch than the other parts. This sensitive part is different in different classes of animals. The four-footed animal is most sensitive in the lips and the tongue; the bird, in the beak and the under side of the toes; the snake, in the tongue; the fish, in the lips; and the insect, in the feelers, or antennæ.

Lesson 28

THE COVERINGS OF LOWER ANIMALS



Observe in nature and in pictures the coverings of different animals, — of four-footed animals, birds, frogs, fishes, insects, crabs, oysters.

Draw or mount pictures of the animals observed and tell and write about where each lives,

— whether in a warm or a cold climate, on land or in water; the most important use of its covering; the season in which the hair is longest and thickest; and when it sheds its covering.

The hair and the feathers of animals are shed, or moulted, every year. A crab sheds its shell, a fish sheds its scales in the form of slime, a snake strips off its outer covering in a single piece, while a frog's skin comes off in shreds. Not all animals shed the outer parts of their coverings at regular intervals.

The growths from the skins of lower animals are hair, feathers, scales, spines, nails, claws, hoofs, horns, beaks, and rattles.

Draw these growths from the skin and write a statement about the use of each growth.

Lesson 29

THE HUMAN SKIN

Look carefully at your skin and answer the following questions: What is its color? Is it smooth, soft, and elastic? Where do you find lines and wrinkles? Where does the skin fit loosely? On which parts of the body is the skin thickest? Where is the skin very thin?

The skin fits the body like a garment, and as

a garment should protect the body and allow all its parts to move freely, so the skin protects the parts under it and allows perfect freedom of movement. It is composed of two layers. By means of a pin you can remove a small piece of the outer layer. You notice that it does not bleed and there is no pain felt in removing the outer skin. It protects the inner layer and it is constantly being shed in the form of little white scales that can always be seen on clothing worn next to the skin. The inner layer is called the "true skin," and the outer layer the "scarf skin." The little nerves that receive the messages of touch, and of heat and cold, end in the true skin.

Look at the drawing of the skin, which is very highly magnified, and find the two layers of the skin.

The hair and the nails grow from the skin. The hair has two parts, the "root" and the "stem." It grows from the root.

Find in the drawing of the skin a root of hair. Look at a single hair and find the root and stem.

Look closely at the tips of your fingers and find rows of little ridges and grooves. On the tops of these ridges are tiny openings into tubes that you cannot find with the naked eye, but which you can readily find with a good hand lens.

On a warm day you will find water, or sweat standing at the mouths of these tubes. These little tubes, more than 2,000,000 of them, are in all parts of the skin, and bring to its surface daily more than a quart of water that has in it impurities that should be removed from the body. They are the drainage pipes of the body and, like all drainage pipes, should be kept open.

Look at the drawing of the skin, which is highly magnified, and find a sweat tube. Describe it.

There are other tubes in the skin that open on the surface. These are the oil tubes. There are not so many oil tubes as sweat tubes, but their openings are larger. They are very numerous in the scalp and in the skin of the face. You can see the openings of some of these tubes at the edges of the eyelids. The liquid they bring to the surface is oily. Of what value is oil to the hair and the skin?

Find in the drawing an oil tube near the root of the hair.

Write a description of what you find in the drawing, and tell about three uses of the skin.

Lesson 30

THE CARE OF THE SKIN

Name three reasons why the skin should be bathed frequently.

Name different kinds of baths that people take either for health or for pleasure. The kinds that are commonly taken are the warm and the cold baths.

The temperature of a warm bath is from 90° to 96°. Warm water should be used upon the face and the hands at least twice a day, and upon the whole body at least once a week. People who are likely to take cold after a warm bath, should take the bath just before going to bed, or else they should follow it with a quick dash of cold water. — G. H. C.

The temperature of a cold bath is from 50° to 75°; of a tepid, or lukewarm, bath, from 75° to 90°. If it is important to know the temperature of a bath, a thermometer, and not the hand, should be used to determine it.

The best time for taking a cold bath is on rising in the morning. At first, the body may be wet with a sponge or a wash-cloth. When one becomes used to the cold, he will enjoy the

quick plunge into cold water, or better still, the cold shower bath. After a cold bath the body should be rubbed with a coarse towel until a warm glow is felt. People who are strong and healthy find great pleasure in the cold bath. Neither a warm nor a cold bath should be taken within at least an hour after a meal. — G. H. C.

In order to have a beautiful, healthy, sensitive skin, other things besides the bath are necessary. The health of the skin, as of other parts of the body, depends upon good food, pure air, pure water, and plenty of exercise.

The use of tobacco and alcoholic drinks is likely to rob the skin of its beauty and its delicate sense of touch.

A Reading Lesson

FROM "THE STORY OF MY LIFE"

I did nothing but explore with my hands and learn the name of every object that I touched. I learned how the sun and the rain make to grow out of the ground every tree that is pleasant to the sight and good for food; how birds build their nests and live and thrive from land to land; how the squirrel, the deer, the lion, and every other creature finds food and shelter.

Indeed, everything that could hum, or buzz, or sing, or bloom had a part in my education, — noisy-throated frogs, katydids and crickets held in my hand, until, forgetting their embarrassment, they trilled their reedy note; little downy chickens and wildflowers; the dogwood blossoms; meadow-violets, and budding fruit trees. I felt the bursting cotton-bolls, and fingered their soft fiber and fuzzy seeds. I felt the low soughing of the wind through the cornstalks, the silky rustling of the long leaves, and the indignant snort of my pony as we caught him in the pasture. Few know what joy it is to feel the roses pressing softly into the hand, or the beautiful motion of the lilies as they sway in the morning breeze. Sometimes I caught an insect in the flower I was plucking, and I felt the faint noise of a pair of wings. The more I handled things and learned their names and uses the more joyous and confident grew my sense of kinship with the rest of the world.[1]

[1] From "The Story of My Life," Helen Keller. By permission of Doubleday, Page & Co.

THE MOUTH

Lesson 31

THE SENSE OF TASTE

Try this experiment at your homes. Close the eyes, and hold the nose between the thumb and the forefinger. Taste of different articles of food, as fruits and vegetables, and name them from their taste.

In the same way try to taste different spices. Can you tell one spice from another? What is the only sensation you have when the nose is closed and different spices are placed on the tongue?

Write the names of the articles of food that you could name from the sense of taste and of those that you could not name.

Find out which part of the tongue is most sensitive to sweet; to bitter; to salt; to sour; which part is least sensitive to any taste.

Look at the tip of the tongue before a drop of vinegar is put on it. Look at it after-

wards. What change has taken place? The little "pimples" that you see are called "taste-buds." They are on different parts of the tongue and the upper and back parts of the mouth, and by means of them we are able to taste.

Place dry articles of food in your mouth. Can you taste them? If dry food is eaten, how must it be changed in the mouth before it can be tasted? The liquid that moistens the food is called "saliva."

What are the uses of the sense of taste?

Animals differ greatly in their sense of taste. Recall some incident that shows that a horse has a sense of taste; a dog; a rabbit. Watch animals in their manner of eating, and compare the horse, dog, rabbit, fowl, and fishes and try to tell which have the finer, or more acute, sense of taste. Which are the more intelligent, those that have a keen taste, or those that have not?

Write three statements telling — the four classes of food that you tasted; the parts of the mouth by which you were able to taste; and the uses of the sense of taste.

Since the sense of taste is a source not only of pleasure, but of use to man, it is important that it be kept sensitive.

Food should be eaten slowly, chewed thor-

oughly, and allowed to become thoroughly moist in the mouth. — G. H. C.

If the tongue is burnt by hot food, it cannot taste for some time. You learned that spices burnt the tongue. If highly spiced or highly seasoned food is eaten continually the sense of taste becomes less delicate. Alcoholic drinks and tobacco burn the inside of the mouth, and in time destroy the sense of taste, besides doing the body still more serious harm. A young person has cause to be thankful if in his daily life simple, wholesome food with little seasoning is placed before him.

(The parts of the mouth will be studied more thoroughly under the chapter on "Foods.")

A Reading Lesson

SENSE OF TASTE IN HORSES

Horses have a very keen sense of taste. If used to soft water, as of a pond or cistern, they will cross running limestone water without touching it, even when very thirsty. In grazing they always choose the soft, short grass of the hillsides rather than the lush growth of the swales and bottoms. They love sweet things, and very bitter ones. When they break into an orchard they

will feed upon ripe fruit, though green may be much plentier, and take sweet apples before sour ones, even riper and mellower. They dearly love the bark upon peach boughs in the second year of growth, also the bark upon poplar poles, and the fibrous inner bark of red oak. Apple bark they will strip off in big mouthfuls with their sharp, cutting teeth, but spit out as soon as they begin fairly to taste it. At work they will nip almost any green thing within reach, though they may drop the nibble as soon as cropped.[1]

[1] From "Next to the Ground," Martha McCulloch-Williams. By permission of McClure, Phillips & Co.

THE NOSE

LESSON 32

THE SENSE OF SMELL

Close the eyes and smell of objects. Write a list of the names of things that you could name correctly by the sense of smell.

Have you ever heard people say as they stepped out in the early morning, or as they drove or walked through the country, "It smells like spring to-day"? What did they mean? What are some of the odors that spring brings? summer? autumn? winter? Have *you* ever noticed these odors?

If you were driving along a road and your eyes were closed, would you know by the odor in the air when you were passing a corn-field? new-mown hay? a field of clover? when you entered the woods? when you were near the water? Name some places you would know by the odor.

Can you name flowers, fruits, and vegetables from their odors?

The sense of smell gives us not only pleasure but important knowledge. What knowledge does it give us that is very necessary — 1. with reference to food; 2. with reference to the condition of the air in rooms and buildings?

Notice, as you enter a house, a church, or a hall, whether the air smells fresh and pure. Notice the same as you enter your sleeping room at night. Make it a rule to keep your bedroom windows wide open all day, if the weather is pleasant.

Train your sense of smell so that you may notice and enjoy at all times and in all places pleasant odors, if there be any, and be very quick to notice if they are unpleasant and possibly injurious.

Write statements telling about the use of the sense of smell and of the pleasure derived from it — of the beautiful places and objects in nature that you know from their odors.

LESSON 33

THE NOSES OF LOWER ANIMALS

THE sense of smell is very strong in some of the lower animals.

Name flesh-eating animals that have a keen

sense of smell. Name also plant-eating animals that have a keen sense of smell. Can you name birds that have a keen scent for food? Snakes and most fishes have a feeble sense of smell. Sharks, however, seem to scent food from a long distance. Snails seem to be guided to their food by its odor, and flies, as we all know, very quickly find the food they like. In flies and other insects the sense of smell is thought to be located in their antennæ, or feelers.

Name animals that have noses; name animals that have no noses.

Draw the noses of three different animals, and write statements answering the following questions about them: Where is the nose placed? What is its shape? Can it move freely? Are the nostrils of the different animals the same in size, shape, and distance apart? What are the two uses of the nose?

What use does an elephant make of its nose? a whale? Where are the nostrils of a whale placed?

Write an incident about some animal that illustrates its keen sense of smell.

Lesson 34

THE HUMAN NOSE

Observe the human nose — its shape, where it is placed, and what it guards by its position. Notice that the upper part of it has a bony framework and that the lower part is of gristle and is movable. Notice the nostrils and the two parts of the nose, the partition between them, and their lining. Notice whether the lining is moist and whether there are hairs at the entrance of the nose. How does the lining aid in purifying the air that passes through the nostrils?

Draw the human nose.

Write the name of each part and connect the name with the part, — upper part, lower part, tip, sides, bridge, and nostrils.

The nose has two uses, one for breathing purposes and the other for smelling, and both are important. In breathing through the nose the air is warmed and somewhat cleansed of dust and other impurities. The sense of smell acts as a guard over the kind of air and the kind of food that is received into the body.

Write a description of the nose.

Care for the nose as follows:

1. **Keep** the nose clean. Do not forget, in taking the morning bath, to snuff a little water up the nose. Then blow the nose thoroughly on some tissue paper or a cheap Japanese napkin that can be burned. Provide yourself with a clean handkerchief and do not neglect to use it. — G. H. C.

2. **Use** the nose for breathing purposes. In breathing keep the mouth closed and breathe through the nose. — G. H. C.

3. **Breathe** at all times, if possible, pure, moist air. — G. H. C.

4. **Train** the sense of smell by using it and enjoying all the pleasant odors in nature. — G. H. C.

5. **Avoid** smoking, snuffing, and any other habits that tend to hurt the delicate lining of the nose and deaden the sense of smell. — G. H. C.

THE EAR

LESSON 35

THE SENSE OF HEARING

Close your eyes and listen to the sounds that are made by different objects, in different places, at different hours of the day.

Write, with the aid of your teacher, or schoolmates, or friends at home, in your blank-books answers to the following questions:

1. What sounds do you hear on rising early in the morning?
2. What sounds do you hear on the way to school?
3. What sounds do you hear at noontime?
4. What sounds do you hear in the evening?
5. What sounds do you hear in the woods?
6. What sounds do you hear in the meadows?
7. What sounds does the wind make in different places?
8. What sounds does the water make?
9. What birds can you name from their notes?

10. What insects can you name by hearing the whirring, chirping, buzzing sounds made by them?

11. What materials or objects can you name by hearing them rustle?

12. What objects or materials can you name by tapping on them?

13. What people can you name by hearing their voices? their laugh? their step?

14. What musical notes can you name by hearing them sounded?

15. Can you tell from the sound the direction in which a wagon or a car is moving?

16. Can you locate objects from the sounds that come from them?

Make a calendar of sounds heard in nature during each month of the year.

The following is a page from a calendar kept by a child.

Do you think the person that kept this calendar lived in the city or country? by the water or inland? In a moderately warm or cold climate? Could you tell the season of the year by this record of sounds?

CALENDAR OF SOUNDS

Birds	Insects	Other Animals	Wind	Water
Robin	Fly	Frogs	Down the chimney	Pattering, dashing, and rattling of drops
Blackbird	Mosquito	Tree-toad	Through the screens	
Oriole	Bumble-bee	Fish splashing	Among the maples and the pines	Splashing of waves
Cat Bird		Cow mooing all day	Roaring before a shower	
Whip-poor-will		Rooster, hens, and little chickens		
Woodpecker pecking a hole in a tree		Sheep and lambs		
Loon				
Crow				
Scarlet Tanager				

LESSON 36

THE EARS OF LOWER ANIMALS

Observe the ears of a horse and of a cow. Draw the heads of these animals and show the position and direction of the ears of animals that have horns and of those that have no horns.

Notice how the ears of the horse open and

how they turn. Can one ear turn in one direction and one in another? How does the horse turn its ears when it is quiet? when it is listening? when it is angry?

Draw or mount a picture of an animal that has large, movable ears.

Draw or mount a picture of an animal that has long, pointed ears that stand erect.

Draw or mount a picture of an animal that has small, round ears.

Draw or mount a picture of an animal that has long, broad, drooping ears.

Draw or mount a picture of an animal that has short, stiff, pointed ears.

Can you tell by the size and the shape of the ears whether the hearing of animals is acute or not?

Can the following animals hear: a bird, a frog, a fish? Have they outer ears? Can you see on their heads any parts that look like ears? Describe what you find.

Some of the lower animals can hear, but they have no ears. The sense of hearing is placed in other parts of their bodies. In the clam it is found at the base of the part called the foot; in the grasshopper, on the first ring of the abdomen, there is on each side a little ear-drum that is

thought to be the organ of hearing; in many insects it is on the wings, and in crabs and lobsters, at the base of their antennæ.

Write one statement about each picture that you have drawn or mounted.

Write a true story proving that an animal has an acute sense of hearing.

Lesson 37

THE HUMAN EAR

Observe the part of the ear that you can see. This part is called the "outside ear." Notice its shape, its irregular surface, and how it projects from the side of the head. Feel of it — are there bones in it? Is it movable?

Observe, if possible, the following experiments:

Suspend a little strip of paper. Strike a blow with a tuning-fork. Hold it near the paper. Notice the effect on the paper.

Balance a splinter on the edge of a glass. Sound the fork and bring the broad face of one prong beneath the splinter. Observe the result.

Fill the glass with water. Sound the fork and

gently touch the surface of the water with it. Observe the result.

What do you learn from these experiments in regard to the tuning-fork when it is sounding a note? How could the tuning-fork move the paper and the splinter when it did not touch them?

If a stone is thrown into water little waves spread out in all directions. In the same manner whenever you speak, or any sound is made, little waves of air spread out in all directions from that which causes the sound. The outer ear catches the air-waves, which pass into the ear. How is the outer ear suited to this work?

The most wonderful part of the ear you cannot see.

Look at the drawing of the ear, and find the tube, or "canal," that leads to the part called the "middle ear." This canal is about an inch long. The entrance is guarded by hairs, and the lining is kept moist by the ear-wax, — a nice provision for protecting the ear from dust and insects.

At the inner end of the canal is a thin partition like a drum-head, that separates the canal from the "middle ear," and is called the "drum." Do you see in the picture the chain of little bones

that connects the drum with the part called the "inner ear"? The air-waves enter the canal, beat upon the drum, and cause the little bones in the middle ear to move or vibrate. These cause motion in more delicate parts of the inner ear, until finally the fine nerves of the ear catch the motion and carry it to the brain where it is received as a message of sound.

Find in the drawing a tube leading downward from the middle ear. This tube connects the middle ear with the throat. Every part that you find has some important use, although you may not learn about it now. All the parts are used in hearing. Nature has carefully protected the inner parts by the bones of the head. A little care on your part and the ear will never fail to bring you from the air-waves messages of sound.

Draw the outside ear.

Write a description of the outside ear and the canal.

Write three statements about the value of a good hearing.

Write one statement naming occupations that call for a quick, trained hearing.

Lesson 38

THE CARE OF THE EARS

Keep the ears clean. On account of the irregular surface of the ears, dirt is easily lodged in them, and it is more difficult to remove it from them than from other parts of the head. The ears should be thoroughly and carefully washed every day. If they are sensitive to cold, warm water should be used in washing them. — G. H. C.

Touch the ear in the most delicate manner. Some people have to protect the ears to prevent cold air from blowing into them. Before bathing, especially in the surf, it is advisable to put some cotton into the ears to keep out sand and prevent the too violent entrance of water. The ears of very young children should be protected from cold and especially from loud noises. Boxing and pulling the ears sometimes causes deafness. Cleaning the ears carelessly with a hard instrument has injured and even destroyed the hearing. — G. H. C.

Train the ear to listen that you may learn quickly and correctly by the sense of sound, and may enjoy all the pleasant sounds in nature. — G. H. C.

The habit of using alcoholic drinks and tobacco will dull all the senses of a boy, and among them the fine sense of hearing. Smoking sometimes causes a roaring sound in the ears. Sometimes, also, it causes an inflammation in the throat that extends to the middle ear and produces deafness. Avoid the use of alcoholic drinks and tobacco as you would avoid a thief who would slyly steal away some of your choicest treasures. — G. H. C.

A Reading Lesson

FROM "THE LAST OF THE MOHICANS"

A warrior rather crawled than walked on each flank, so as to catch occasional glimpses into the forest; and every few minutes the band came to a halt, and listened for hostile sounds, with an acuteness of organs that would be scarcely conceivable to a man in a less natural state.

"What do you hear, Chingachgook? For to my ears the woods are dumb."

The Indian bent his body till his ear nearly touched the earth. "I hear the sounds of feet!"

"Perhaps the wolves have driven a buck to shelter, and are following on his trail."

"No. The horses of white men are coming!" returned the Indian, raising himself from the ground. "Hawkeye, they are your brothers; speak to them."

"That will I," said the hunter; "but I see nothing, nor do I hear the sounds of man or beast; 't is strange that an Indian should understand white sounds better than a white man. Ha! there goes something like the crackling of a dry stick, too — now I hear the bushes move — yes, yes, there is a trampling that I mistook for the falls — and — but here they come themselves." — *J. Fenimore Cooper.*

THE EYE

LESSON 39

THE SENSE OF SIGHT

Answer the following questions and write the answers as statements in your blank-books:

1. Did you see any unusually interesting object on your way to school? If so, describe it.

2. Have you noticed the shade trees along the street? What kinds are they? Are they large or small, young or old? Were there places where there were no trees?

3. Do grass and any kinds of flowers grow along the street? If so, where?

4. What living things besides grass and flowers did you see?

5. Did you look at the sky? Was it clear or a grayish blue? Were there any clouds?

6. Did you notice the sunset last evening? If so, describe it.

7. **Look** at each of several objects that some one holds before you while he silently counts five

and which he then hides. Describe every object shown — tell about its shape, size, material, surface, and use.

8. **Look** at a word of three letters. Close your eyes. Can you "see in your mind" the letters as they looked? Can you remember in the same manner a word of four letters? of five letters? of six letters? In the same manner use letters that do not spell words.

9. **Read** a short line of poetry. Close your eyes. Can you see the words in the line?

If you look at anything closely you are quite likely to remember it. You have heard pupils say that they cannot remember, that they are not good spellers, that they cannot draw, that they cannot do many other kinds of school work. What may be one of the reasons why they are not able to do their work well?

Which one of our senses acts most quickly? Which one is most valuable to us? Nearly every trade and profession demands good eyesight, and every means should be used to train the eye to see quickly and correctly.

Play the following game with your teacher:

A SEEING CONTEST

The pupils are provided with pads and pencils.

1. The teacher shows for half a minute a collection of objects arranged on a table or a tray. Then she covers them. Each pupil writes on his pad the names of all the objects that he saw.

2. Three minutes are given in which to write the names of objects in the room that are made of the same material, as of wood, iron, brass, paper, etc.

3. Three minutes each are given in which to write the names of objects in the room of animal origin; of plant origin; of mineral origin.

4. Three minutes are given in which to write the names of objects that have the same color, the teacher naming the color.

5. Three minutes each are given in which to write the names of objects that have curved surfaces; plane surfaces.

The game may be extended to any length.

The pupil who has the longest list of correct names wins the game.

Lesson 40

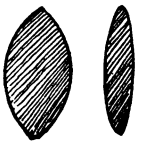
THE EYES OF LOWER ANIMALS

Observe and tell where the eyes of some of the lower animals are placed — the eyes of a horse, a cat, a bird, a frog, a snake, a fish. If you have ever seen a flatfish you know that both of its eyes are on one side of its head, which looks like the top, because it swims on the opposite side.

A lobster has its eyes on the tips of movable stalks. A land snail has its eyes on the tips of flexible stalks that can be withdrawn into the head. The eyes of a scallop are the tiny colored spots that may be seen on the edge of its mantle, when it opens its shell. A spider has eight eyes that look like little black beads. An insect has three "simple eyes" that look like three little dots on the top of its head, but its true eyes are the round, smooth places on the sides of its head. These are made up of hundreds and even thousands of simple eyes and are called "compound eyes." Have you seen the eyes of any of the animals just referred to?

Observe the shapes and the expressions of the eyes of different animals. Name animals

that have large, bright, intelligent eyes; small, dull eyes; wild, fierce eyes; eyes that sparkle and move as quick as a flash.



Observe in the eyes of different animals the dark spot, called the "pupil." Look at the pupils of the eyes of a dog, a cat, a cow, a sheep, and a horse. How do they differ in shape? How does each change its shape and size as the light changes? Observe the difference of direction between the vertical pupil of the beast of prey and the horizontal one of the grazing animal.

Some animals have no movable eyelids and cannot close their eyes. Is this true of the horse? the bird? the snake? the frog? the fish? Again, some animals have a third eyelid. Have you ever seen it move across the eye of a bird? During sleep the third lid covers the eye of the cat, and may be seen by lifting the upper lid gently before it wakes. You can see a little trace of this eyelid at the inner corner of your own eye.

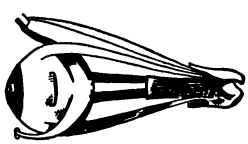
Though many of the lower animals have large, beautiful eyes, their sense of sight does not tell them so much as their sense of smell. The brain is not trained to know things by sight. A dog does not always know his master when he sees him at a little distance, and a deer will

look at a hunter without fear, if the wind carries the scent in an opposite direction. Find out whether a cat has a keener eyesight than a dog. Observe other familiar animals and learn something about their sense of seeing.

Write statements about the eyes of five lower animals, describing their position, shape, expression, and use.

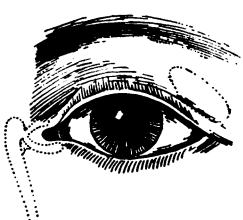
Lesson 41

The Human Eye



The human eye is a little sphere, about one inch in diameter. It is placed in a bony socket beneath the forehead and is protected in such a manner that if one were to fall, or an object were to strike that part of his head, his eyes would not be likely to be hit.

Tell how the eyebrows, the eyelids, and the eyelashes further protect the eyes.



The eyes are kept moist by the tears. The tears start from the part called the "tear gland" on the outer side of each eyeball, and move across its surface to the inner corner. At the inner corner of the eye are two openings into the little canal that drains the tears into

the nose. Find on the lower eyelid one of the openings into this canal. Find in the drawing of the eye all the parts that have been named.

Hold the head still and tell in how many directions you can look without turning the head. Do both eyes move together? These movements are made by the action of several muscles that are fastened to the eyeball. Find the muscles in the drawing.

You can see only the front part of the eyeball. The "white" is a part of the tough outside coat. This outside coat bulges a little as it passes over the front of the eyeball, where it is as clear as glass, and is called the "cornea." The colored part, back of the cornea is called the "iris," and the round opening in its centre, the "pupil." Back of the pupil is a beautiful object that you cannot see. It is called the "crystalline lens." (The glasses of spectacles are lenses.) Light enters the eye, which is very dark inside, through the pupil, and, passing through the lens, makes on the back part of the eyeball pictures of the outside world.

Draw the human eye as it appears to you.

Write the names of the parts of the eye that can be seen — eyebrows, eyelashes, eyelids,

eyeball, white, cornea, iris, pupil, openings into tear canal, called the tear duct.

Write statements telling the uses of the parts.

Lesson 42

THE CARE OF THE EYES

The best kind of light for reading or for any kind of work is daylight; but too much light for the eyes is as bad as too much sound for the ears. Care should always be taken to protect the eyes of young children, especially, from the direct rays of the sun. Reading out of doors or with the sunlight falling on the book is trying to the eyes. Do not face a bright light. Either the light or the eyes should be shaded. Reading between daylight and dark, or in a dim or flickering light, will strain the eyes. In reading, the light may fall upon the book from either side. In working, or writing, if the right hand is used, the light should fall upon the work from the left side. — G. H. C.

Sit erect while reading. Hold the book from fifteen to eighteen inches from the eyes. — G. H. C.

Rest the eyes, as well as every other part of

the body, when you are tired or sleepy, and do not try to read or work.

Perfect cleanliness of the eye is necessary in order to have good eyesight. The want of cleanliness is one of the chief causes of sore eyes. The eyes should be carefully and thoroughly washed at least twice a day. — G. H. C.

The body should be well nourished. It must be supplied with pure air and healthful food and drinks. Then the eyes with all other parts of the body will be strong and healthy. — G. H. C.

The use of tobacco by young boys often causes serious trouble with the eyes. Sharp pains are felt in the eyeball, the lids become inflamed with the smoke, the sight becomes confused, and sometimes blindness results. Persons interested in sports report that a good marksman often loses his skill in aiming, and a base-ball batter, in batting, owing to a defect in their eyesight caused by the use of tobacco.

The use of alcoholic drinks, as we all know, often causes the eyes to look red and bleared. The eyeball becomes inflamed and other parts of the eyes are more seriously injured.

If a cinder or particles of dust get into the eyes the best thing that can be done at first is to close the eyes gently, and, without any outside

pressure being brought to bear on them, keep them closed for a short time. The tears, which nature has provided for washing the eyes, will cause any substance that is not deeply imbedded in the eyeballs to move toward the inner corner of the eye, and then it can be easily removed.

A good rule to follow in caring for the eyes as well as for the other organs of sense is, TOUCH NOT, except in the most delicate manner possible, and then only for the sake of cleanliness.

THE VOICE

Lesson 43

VOICES OF LOWER ANIMALS AND OF MAN

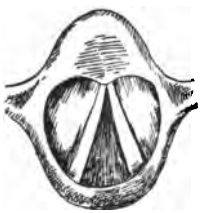
Knowledge is gained through the five senses. You give this knowledge to others, or express it by different means — by means of actions, as in your daily work and manner of living, by gestures, by the expression of your face, and chiefly by sounds.

Name animals that hiss; croak; sing; grunt; roar; low; neigh; bleat; bark; purr and mew; talk.

Animals that live in the water are very quiet. The drum-fish and some others can make noises by means of the swim-bladder or with the teeth. Crabs also make noises by rubbing their fore legs against their shells. Insects we know are very noisy. The sounds they make are produced by rubbing the wings together or against the legs, or by rapid movement of the wings, and by other means. Name insects that you have heard sing, hum, chirp, or buzz. Can you tell how these noises are made?

The organs that produce the voice in birds are in the lower part of the windpipe; in man and other mammals they are in the upper part.

Feel on the outside of the throat, under the chin, a hard lump, called "Adam's apple." This is one corner of the little box called the "larynx," that is at the top of the windpipe, and in which the voice is produced. Two folds of the lining, called "cords," stretch across this box, and when you wish to speak, the muscles attached to them cause them to tighten, and the air passing between them makes them move rapidly, or vibrate. The vibration of the cords in the larynx aided by the movements of the lips, teeth, tongue, cheeks, and palate, produces all the sounds of the voice of man.



Write five statements about the voices of animals.

Describe the organs of the voice of man.

Lesson 44

The Use of the Human Voice

Name different sounds that man can make and tell what they mean, as singing, laughing, shouting, etc.

Speak different letters and words and notice the parts of the mouth used in forming them.

Show how the voice can be used. Imitate some sounds that animals make. Read something that calls for loud tones; for low tones; for a whisper. Read a selection in one tone; read it changing the tones.

The voice may be cheerful, hopeful, gentle, calm, sad, harsh, angry. What does the voice tell about a person? What kind of a voice do you like to hear? What kind of a voice would you like to have? Whenever you speak you should use tones that can be heard distinctly, without effort, by those who are listening to you. Some people have naturally good voices, others get them by training. Training the voice means not only exercising the voice, but training in breathing and in exercising and caring for the whole body. Since the voice tells what you think and feel, in fact what you are, whether refined or coarse, training the voice, making it useful and pleasing, means the training of the whole person, body and mind.

Write a statement telling the kind of tones we should use in ordinary conversation. — G. H. C.

Copy the following quotations from Shakespeare and commit them to memory:

Her voice was ever soft,
Gentle, and low, an excellent thing in woman.

KING LEAR.

And such a one my daughter might have been;
As silver voiced; . . .
Who starves the ears she feeds, and makes them hungry,
The more she gives them speech.

PERICLES.

PRINCIPAL NEEDS

A PICTURE STORY ABOUT THE LITTLE GIRL
WHO LOVED

THE WIND

AND WATER

AND PLAY

AND GOOD FOOD

WRITE THE STORY

AIR

Lesson 45

AIR AND THE SENSES

How do you know that air is all about you?

Feel the air. Extend the arms at the sides and wave them back and forth. Stand for a moment before an open door or window. How does the air feel — hot or cold? dry or damp? When you step out of doors the first thing in the morning, notice how the air feels, and, whether it is hot or cold, dry or damp, enjoy it.

Listen to the sounds made by the air. Have you heard the wind whistle, sing, whisper, sigh, and roar? When and where did you hear these sounds?

Notice the odors the air brings to you some fine morning when you exclaim, "Oh, how good the air smells this morning!" Have you noticed the odor of the air in the woods? in the fields? by the water? when the grass is pushing up through the earth? when the grass and the leaves are dying?

Notice the movements caused by the air. Observe and report such movements. Have you ever seen the air?

Plunge an "empty" bottle mouth downward into a pail of water. Does the water enter the bottle? Why not? Was the bottle really empty? What was in it?

When water is heating in a basin you may see little bubbles form on the bottom and the sides of the basin and rise to the top of the water. What are these bubbles? Two things may be learned from seeing these bubbles — that there is air in the water, and that heat causes the bubbles of air to grow larger and lighter and pass to the top of the water.

When wood is burning, you often hear a snapping as if something were exploding. What is it that causes the snapping?

If all the senses are awake, something can always be learned about air. When it is quiet you may not notice it, but whether you notice or not, it is always here and everywhere about the earth — on the mountains, in the caves, in the soil, in the water (as you have just learned), and in every place it is used for some important purpose. Think of the air as a great ocean that surrounds the earth — an ocean that is broader

and deeper than any body of water, one that moves in great waves and smites with terrific force when it is in rapid motion. Then think of plants and animals as living at the bottom of this great air-ocean and dependent upon it for life.

Write four statements telling what you have learned about air from the senses of feeling, smelling, hearing, and seeing.

Write about the experiment that proved that air filled space.

Write about one experiment that showed the effect of heat upon air.

Lesson 46

THE USES OF AIR

The most important use of air is told by the following quotation: "You were in the 'House Beautiful' when it was very small. I fancy you did not like it very well, for you cried out for help, and a good fairy named Aura rushed into your house and took possession of one of your empty rooms, and has made her home there ever since. With Aura came the gift of earthly life."

In the above quotation what is meant by Aura? by one of the empty rooms?

Name the most important use of air to man and to all animals and plants.

Place a lamp-chimney over a lighted candle. Do not allow air to enter at the bottom. Place a card for an instant over the top. Leave both top and bottom open. What have you learned in regard to an inlet and an outlet for air for the burning candle?

Then another use of air is to support combustion. What is the meaning of "combustion"? If you start a fire in a stove, what must you do to the draughts? Why?

Only part of the air, called "oxygen," is used in breathing and burning.

Tell how air may be used as a motor-power: on water; on ice; on land.

Wind is air in motion, and it may bring us heat or cold. If the winds blow from a colder country than ours, what do they bring to our climate? When would they be welcome? If they blow from a warmer country what do they bring?

Write statements telling about four of the different uses of air.

A game was played by a teacher and her pupils, in which the teacher told what her

"thought" (air) was like. The following are the statements that she made. Can you answer the question, "Why?" after every statement? Write your answers.

My thought is like an ocean. Why?

My thought is like a blanket. Why?

My thought is like a winged messenger. Why? What gifts does it bring?

My thought is like a feather. Why?

My thought is like French plate-glass. Why?

My thought is like a stoker. (What is a stoker?) Why?

My thought is sometimes like a busy workman. Why?

My thought is sometimes like an idle fellow. Why?

My thought is sometimes like a rogue. Why?

My thought is sometimes like a dainty fop. Why?

Can you think of anything else that my "thought" is like?

Copy the following into your blank-book:

Air, air, fresh life-blood, thin and searching air,
The clear, dear breath of God that loveth us,
Where small birds reel and winds take their delight!
Water is beautiful, but not like air.

ROBERT BROWNING.

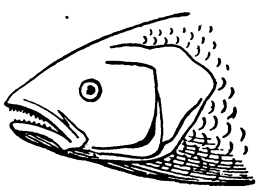
Lesson 47

How Air Enters Living Things

Name two passages by which air may enter the lungs of man. Which is the smaller, more winding passage? Air in passing through the nostrils is made warm and moist before reaching the lungs. If there is dust in the air it is likely to be strained out in these passages, from which it can be more easily expelled than from the lungs. Which, then, is the better way for air to enter the lungs?

Observe the breathing movements of lower animals, — a horse, a dog, a cat, and other pets. Do they use the nostrils in breathing? Do any of them at any time use their mouths?

Does a fowl or a bird breathe through its nostrils?



Watch a gold-fish in a globe. How was it shown that there was air mixed with the water? Notice the movements of the mouth and of the gill-covers of the fish as water enters the mouth and passes out over the gills. The fish gets from the water all the air that it needs.

Name other "water-breathers," that is, animals that breathe the air that is in the water.

Find in the oyster four flat gills that are exposed to the air in the water when the shell is opened. In the clam the gills are enclosed in a tube. Lobsters and crabs also have gills covered by the shells at the sides.

Find in the abdomen and the thorax of an insect the breathing holes along the side. These holes are called "spiracles." They open into little branching tubes that carry air to all parts of the body of the insect.

Can you find with a hand lens the breathing-holes in the lower side of the abdomen of a spider? A snail has a breathing-hole on one side of its neck. The earthworm, living in the ground, finds air between the particles of dirt, and takes it into its body through its skin.

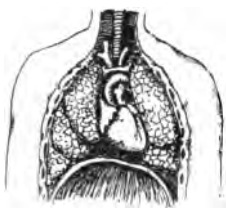
Animals, then, take air into their bodies by means of noses, mouths, gills, spiracles, and skin. If you were to examine the under side of a leaf with a microscope, tiny mouths or openings, called "stomata," might be found, by which air enters the leaves of plants. Every living thing has some means by which it gets air.

Write five statements telling different means by which air enters the bodies of animals.

Lesson 48

THE LUNGS

In higher animals the air enters through the nose or the mouth and passes through the windpipe into the lungs.



Look at the lungs in the drawing and tell the number of lungs and where they are placed.

Do the right and the left lung look exactly alike? How many parts, or "lobes," has the right lung? the left lung?

In order that the lungs may be shown as in the drawing, what coverings must be removed? (See Lesson 20.)

What bones protect the lungs in front? on the sides? on the back?

Find the windpipe to which the lungs are attached. Can you feel on the outside of your neck the hard top of the windpipe? What is the name of this box? What is its use?

You may have seen the lungs or "lights" of a fowl when it was being dressed, or the lungs of some animal in the market. If you have, you know that the color of the lungs is pinkish, or pinkish gray, and that their surface is so smooth that it fairly shines. If you were to feel of these

lungs you would find that they were light and spongy. Indeed, they are so light they will float in water. Can you think of any reason why they are so light?

Watch the movements of your chest.

Place your hand over your right lung; over your left lung. When does the chest become larger? When does it become smaller? What is meant by a complete breath?

Sit erect, breath naturally, and count the number of complete breaths you take in a minute.

Write a description of the lungs — their position, number, color, protection, use.

Lesson 49

THE HEART AND THE BLOOD-VESSELS

Place your hand over your heart. Can you feel it beat? Can you count the beats made in a minute? Which works more rapidly, the heart or the lungs?

In health the heart of an adult, or grown person, beats about seventy-two times and the lungs take eighteen breaths every minute. The fresh air enters the lungs at every breath and the part

of the air called oxygen, that all living things need, makes the blood that is in the lungs pure and of a bright red color.

Look at the drawing and tell where the heart is placed; notice its shape; the right and the left side. The heart would not show in this manner if the lungs, which nearly cover it, were not pushed aside.

The heart acts like a little force-pump. It is no larger than your fist, yet its walls are so strong that every time it beats it forces the blood through little tubes to every part of the body. By a nice arrangement it sends the impure blood to the lungs to be made pure, while the pure blood is sent to build up all parts of the body.

Place your fingers on the thumb side of your wrist. Can you feel the beating of your pulse? What you really feel is the flowing of the pure blood in jets, or waves, as it is sent at each beat of the heart through the tubes called "arteries." Can you feel the pulse in any other parts of the body?

In the same wrist notice the blue markings just under the skin. These are tubes, called "veins." Through them and others in all parts of the body the dark, impure blood flows back to the heart.

Write statements telling about the work of the lungs.

Write statements telling about the work of the heart.

Lesson 50

PURE AIR

Make a list of the names of buildings, rooms in the home, and conveyances for travelling that especially need pure air.

Where is the air purer — in the city or in the country? outdoors or indoors? Why?

Name five or six causes of impure air indoors.

In order that air may be pure indoors three things are necessary: ventilation, sunlight, and cleanliness. What is meant by "ventilation"?

One simple way of ventilating a room is to raise the lower sash and fit under it a board two or three inches wide. The opening between the two sashes allows the cold air to enter and take an upward direction. Which is the lighter, cold air or warm air? Why should cold air enter as near the ceiling as possible? Where should warm air enter? If an opening is provided for the entrance of pure air, should not one be provided also for the escape of impure air? An

open fireplace or stove furnishes one of the best means of removing the impure air from a room.

Even if rooms are supplied with some system of ventilation, it is a good plan to throw open the doors and windows in the morning and let the sunlighted morning air come directly into the rooms and find its way to every corner. Woollen clothes and bedding should be put often in the air and sunshine.

Remember — a really good housekeeper will have clean, sweet air in all her rooms; and a really good *body-keeper* will demand clean air for the "House Beautiful." He will not breathe foul air any more than he will drink foul water or eat unclean food. It is easy to repeat the words, "Air is everywhere: we need air," but how many people notice it everywhere or anywhere, enjoy it if it is pure, or object to it if it is impure?

There are two instruments that should be in every school-room and home. These are a thermometer and an air-tester. The thermometer tells us the temperature of the air, which should not be over seventy degrees. An air-tester tells us something about the purity of the air. A simple air-tester is lime-water in a clean bottle. The lime-water is made by pouring hot water over a small lump of lime. The lime settles and the clear

water is poured off and bottled. Fill the clean bottle with water and bring it into the room whose air is to be tested. Empty the water out and the air in the room fills the empty bottle. Pour into the bottle a small quantity of lime-water. Shake the lime-water and if it becomes milky white, the air in the room is not fit to be breathed; if the lime-water remains clear, the air is pure.

Adopt Good Health Rules based on the following directions:

1. **Notice** as you enter public buildings, the rooms of your home, and especially your own sleeping room, whether the air is pure or not.
2. **Provide** some way for fresh air to enter your sleeping room.
3. **Notice** in the morning whether the air in your room is fresh and pure.
4. **Toss** off the bed-clothes before leaving your room in the morning, and throw the windows wide open.
5. **Stand** then at the open window and take one or two of the breathing exercises described on the next page.

Write a statement, naming five or six causes of impure air.

Write descriptions of two or three methods of ventilating rooms.

BREATHING EXERCISES

"Breathe in" and "breathe out." Watch the rising and the falling of the chest during these two acts. Call these acts "inhaling" and "exhaling."

1. Stand erect, close the mouth, and inhale through the nose a deep breath. Exhale, making the sound *sh*. What does it sound like?

2. Inhale and exhale, making the sound *oo*. What does it sound like? Make the sound *m*. Make a whistling sound.

3. Inhale slowly and exhale very carefully as if blowing soap-bubbles.

4. Move quietly about the room and see how long you can keep bits of down or cotton floating in the air by means of the breath.

5. Inflate a toy balloon with one breath. Tie it and toss it into the air. By gentle taps and gentle movements see how long you can keep it from touching the floor.

6. Cut birds out of different kinds of paper so that they will be of different weights — one out of tissue, one out of silver, and one out of heavy manilla paper. Hang up the birds by strings so that they will hang in front of the face. Take a deep breath and see how high you can blow each bird.

7. Practise the swimming exercise described on p. 30.

8. Inhale while counting six; hold the breath while counting three; exhale while counting six; rest from breathing while counting three. Repeat six times.

9. Inhale a deep breath. Exhale in three short breaths. Repeat three times.

Lesson 51

THE CARE OF THE HEART AND THE LUNGS

Some organs of your body may rest while you sleep, but the heart and the breathing organs work day and night. The best aid that you can give them as they do their work, is to breathe plenty of fresh air, eat wholesome food, drink pure water, wear loose, sensible clothing, have a mind that is calm and cheerful, and avoid bad habits of all kinds. Work and play are good for the heart and the lungs, but over-doing weakens them. The little girl who jumps her rope fifty or a hundred times, the boy who rides his wheel at a high speed until he is exhausted, the men and women who overcrowd their days with work and pleasure, are over-working the heart, and sooner or later they will suffer from so doing.

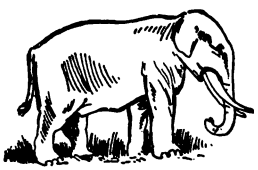
Cigaret smoking usually weakens the heart. Boys who smoke have frequently sudden attacks of irregular beating of the heart. It beats quickly, then more slowly, then quickly again. This irregular beating of the heart is known as the "tobacco heart," and it may lead to serious results. One of the medical examiners of the United States Navy has said that one man out of every one hundred applicants is rejected because of weak heart from the use of tobacco. We learn also that one-fifth of the boys who apply for admission to the naval schools are rejected on account of heart disease, and that in ninety per cent of these cases the disease is caused by the use of tobacco.

The effect of smoking on the lungs is usually injurious. The throat, wind-pipe, and tubes leading to the lungs become inflamed, causing a cough and injuring the voice, while the lungs themselves may become inflamed if the smoke is drawn into them.

FOOD

Lesson 52

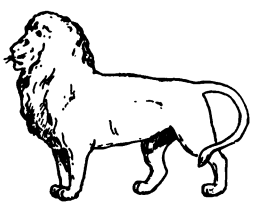
TWO KINDS OF FOOD



Write in a column the names of ten articles of food used by man.

Write opposite the name of each kind of food, whether it comes from a plant or an animal.

The food, then, of man comes chiefly from what two sources? Can you name an article of food that is neither plant nor animal?



Draw or mount a picture of an animal that eats only plant food. Name animals that eat leaves; fruit; seeds; bark; roots.

Draw or mount a picture of an animal that eats only flesh or animal food. Name animals that feed on fish; birds; worms and insects; small animals; large and small animals.

Draw or mount a picture of an animal that eats both plant and animal food.

Write two statements about each picture, telling what the animal eats, and whether its nature is mild or fierce.

Lesson 53

PLANT FOOD

The fruit of any plant is the part that holds the seed. Tell, then, why the pumpkin, the tomato, the cucumber, and the chestnut are classed as fruits.

Some fruits have in the centre a hard stone containing the seed, and are called "stone fruits."

Draw or mount a picture of a stone fruit that is used for food.

Other fruits, as the apple and the pear, are called "fleshy fruits." Why are they so named?

Draw or mount a picture of a fleshy fruit that is used for food.

Other fruits, as nuts and grains, have very little water in them, and are called "dry fruits."

Draw or mount a picture of a dry fruit that is used for food.

Draw or mount a picture of a plant whose leaves are used for food.

Draw or mount a picture of a plant whose stalk is used for food.

The roots of some plants are large and juicy. Name several of such plants.

Draw or mount a picture of a plant whose root is used for food.

Some plants have stems, as well as roots, growing underground. One kind of underground stem is called a "tuber" and another kind, a "bulb." Find the meaning of these words.

Draw or mount a picture of a tuber that is used for food; of a bulb.

Name some kinds of plant food that are eaten raw; name others that are usually cooked.

The object of cooking fruits, vegetables, and other kinds of plant food is to soften them and to improve, and not destroy, their flavors. Nearly all vegetables should be cooked whole and in their peels. If they are boiled, they should be cooked quickly and in as little water as possible.

Write about each kind of plant food whose picture you have drawn or mounted, telling its name, where and how it grows or is raised, when it is ripe, and how it is used for food.

Lesson 54

WHEAT

Name the kinds of flour of which bread is made. Bring to school samples of whole wheat, rolled wheat, farina, Graham flour, fine white

flour, and bran. Put the specimens into little bottles and mount them on a card.

From what plant do all these specimens come? Does it grow in your locality? When is it planted, in the fall or in the spring? Describe its growth — the ploughing and the preparation of the soil; the sowing of the grain; its appearance when it first comes up; its appearance when ripe; the manner of harvesting, binding, threshing, winnowing, and grinding.

Write a description of the growth of wheat.

Examine grains of wheat. Find the "husk," the "hull," the "pulp," and the "germ." Which part is always thrown away? Which part is often thrown away that should be retained? Crush some kernels of wheat. Is the flour dark or white? Scrape off the hull from some kernels and crush them. Is the flour dark or white? Examine all the specimens in the bottles and find out what parts of the wheat are in the samples.

Write a description of each of the samples in the bottles.

Lesson 55

From Wheat to Bread — a Picture-Story

Find and mount in your blank-books pictures that tell the whole story of "From Wheat to Bread."

1. The Plowing
2. The Sowing
3. The Reaping
4. The Harvesting in Barns
5. The Grinding

The pictures that you find may show old-fashioned methods of raising and preparing wheat for flour. Can you not find and mount side by side in your blank-book pictures that show both modern and old-fashioned methods?

Copy and commit to memory the following stanza:

Back of the loaf is the snowy flour,
And back of the flour is the mill;
And back of the mill are the wheat and the shower,
And the sun and the Father's will.

Babcock.

Find out how bread is made and write a composition on "Bread-making."

FROM WHEAT TO BREAD — A STORY TOLD IN PANTOMIME

Sowing Grain. Count three: one—advance the left foot and take a handful of grain from an imaginary bag hanging from the neck in front of the waist; two — swing the right arm to the right and back as far as possible, turning on the right foot; three — bring the right arm around with a sweeping movement, as if scattering the grain, at the same time advancing the right foot. Repeat the movements until you have passed once around the room.

Cradling. Count two: one — advance the left foot, raise both arms upward to the right as high as the right shoulder; two — advance the right foot, bring both arms downward, to the left, with a sweeping movement, as if cutting the wheat. Repeat the movements until you have passed once around the room.

Threshing. Count two: one — grasp an imaginary flail, advance the left foot, raise both arms upward to the right as if lifting a flail; two — bring the arms downward as if threshing. Repeat the movement ten times.

Winnowing. Count two: with the elbows slightly bent move the arms rapidly and rhythmi-

cally back and forth from right to left. Repeat ten times.

Grinding. Count two: extend the arms at the sides, palms to the front, and without moving the arms twist the trunk from right to left and from left to right, illustrating the movement of the stones in crushing the wheat. Repeat ten times.

Transporting the Flour. Count two: extend the arms at the sides, palms downward, and without moving the joints of the arms bend the trunk from side to side, compelling the arms to take the position of a walking-beam on a steamboat. Repeat ten times. Or imitate the steam engine by means of the breathing exercise in which you sound *sh*. (See page 124.)

Are all the preceding methods of work used to-day by the farmer?

Lesson 56

ANIMAL FOOD

Draw or mount pictures of three domestic, four-footed animals whose flesh, or meat, is used for food. What is each kind of meat called?

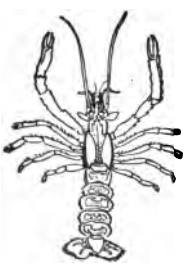
If you go to the market you will hear about the different cuts of meat. Some of the most

common cuts of beef are shoulder, chuck, neck, prime ribs, sirloin, rump, round, leg. Prime ribs and sirloin are cuts that have the finest flavor and are the highest priced. Some of the cheaper cuts are equally valuable for food. Good beef should be bright red, streaked with fat, not too moist, and should have no odor.

Draw or mount pictures of three wild animals whose flesh is used for food.

Draw or mount pictures of three kinds of fowl whose flesh is used for food.

Draw or mount pictures of three kinds of animals that live in the water and are used for food.



All kinds of animal food, with the exception of clams and oysters, are usually cooked before they are eaten. There are several methods of cooking meat, as broiling, frying, roasting, stewing, and boiling. Meat may also be used for making soups. Find out how some of the " cuts " named in the lesson may be used. The object of cooking meat is to make it tender, and improve the flavor, without allowing the valuable food part of the meat to escape. Find out the best three methods of cooking meat and describe them.

Write about each animal whose picture you

have drawn or mounted, telling the name of the meat it furnishes; whether it is wild or tame — if wild, the season when it may be killed; where it lives — on land or in water; and the best method of cooking the meat.

There are several other kinds of animal food, as eggs, milk, butter, cheese, and lard.

Write about the different kinds of eggs that are used for food — find out about their value as food and the different ways of cooking them.

Write about milk — find out about its value as food, the cleanliness and the care that are necessary in order to keep it sweet, and the object of boiling it.

Lesson 57

MINERAL MATTER AND FUEL FOODS

Both animal and vegetable food are composed of materials that build up the body and enable it to do work.

If you burn animal or vegetable food there will remain ashes that cannot burn. This part is the hard, or the "mineral," part of food. It helps to build up every part of the body, especially the hard parts, such as the bones and the teeth. Plants take the mineral matter from

the soil. Animals eat the plants and in this way get the mineral matter. Mineral matter is commonly used for food only as it is found in animal or vegetable food, but salt, a mineral matter, is used as a flavor or relish to many foods.

Put a little dry starch in cold water. Does it dissolve? Place a little on your tongue. How does it taste? Mix a little starch with cold water and add boiling water. How does it look? Place a few drops of boiled starch mixed with water on a little dish, or on a square of paper. If your teacher will add a drop of iodine solution to the starch you will notice a change in its color. This color always comes when iodine is added to cooked starch.

Boil different kinds of food as oat-meal, wheat, rice, corn, potatoes, carrots, cabbage, tomatoes. Mix a little of each with water, add a drop of iodine, and find out whether there is any starch in it. Many of our foods are full of starch, others have only a little.

Starch is called a "fuel food" because it is used by the body to keep it warm and furnish strength for work.

Sugar is another fuel food. Name fruits and vegetables in which you can taste the sugar. Is there sugar in milk?

Fat is a fuel food. Name animal fats. Name vegetable fats. When do we see the fat in milk? Find out if fats are lighter than water.

Write one statement about mineral matter in food.

Write a description of your experiments with starch.

Lesson 58

FLESH FOODS

Mix different kinds of flour with water. Is the dough in every case sticky? The part of the flour that causes the stickiness is called "gluten," and it is one of the best building materials for the body.

Foods that build up the body are called "flesh foods."

Soak kernels of wheat and corn. Cut them lengthwise through the centre. Find in each the hull, the pulp, and the germ. The hull is rich in gluten and it should not be thrown away. The greater part of the pulp is starch. The entire kernels of corn and wheat make excellent food, for they give us both gluten and starch, that is, flesh and fuel foods. Wheat, corn, rye, oats, barley, and rice contain gluten.

Pour boiling water on the white of an egg. What change takes place in the looks of the white? Pour boiling water on a piece of raw meat. What is the result? The part that turned milky white in the egg and in the meat is the flesh food. In animal food it is called not "gluten," but "albumen." The flesh food, or "curd," can be found in milk by adding a few drops of rennet to it. Beef, veal, mutton, pork, fowl, fish, and oysters have flesh food in them, some kinds of meat having much more than others.

Make drawings of the kernels of grain cut through the centre and write what you learned about them.

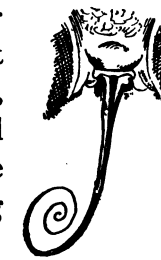
Write two statements about fuel foods; and two about flesh foods.

Lesson 59

First Steps in Eating

Before an animal can eat, it must get its food. It is interesting to notice the means by which food is brought to the mouths of animals.

Observe for one day animals, or their pictures, and report all that you are able to learn of the parts of the body used by different animals in



getting their food — how some animals use their teeth; others, their lips and teeth; others, front limbs and teeth; others, beaks and claws; others, tongues; others, needle-like tubes or long, coiled ones. Notice the special contrivances of some animals, as the nose of the elephant, the long neck and long tongue of the giraffe.

The animals called mammals have fleshy, movable cheeks and lips. Can you find animals that do not have these? Which have thicker lips, flesh-eating or grass-eating animals?

Observe the tongues of different animals. Find animals whose tongues are rough; animals whose tongues are smooth. How is a cat's tongue suited to its use? Has a bird a tongue? a fish? What animal has a forked tongue? What animal has a tongue attached at the front part of the mouth? For what purpose does this animal use its tongue?

Observe the teeth of lower animals — the number of rows; the shape of the teeth used in cutting; in tearing; and in grinding food; and how the teeth are suited to the kinds of food that the animals eat.

Observe the teeth of grass-eating animals, — the number and the large size of their grinding teeth. Has a horse cutting and tearing teeth?

Do a horse and a cow bite the grass in the same manner? Has a cow cutting teeth on both of its jaws?

Observe the long, sharp, pointed teeth in the mouth of a dog or a cat. They are better suited for tearing than for grinding.

Observe the long, sharp cutting teeth of a rabbit or a squirrel. These teeth are suited for gnawing. They would soon be worn away, were it not for the fact that they grow throughout the life of the animal. The gnawing animals have no tearing teeth whatever.

What have birds instead of teeth? How do the beaks of a chicken, a duck, a hawk, and a heron differ? Which have the harder beaks, land birds or water birds?

Find out whether a fish has teeth, where they are placed, and their use.

Write two statements about the teeth of a horse; a cow; a dog; a rabbit; and a fish.

Lesson 60

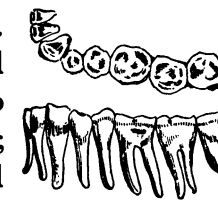
THE HUMAN MOUTH

Observe some one's mouth — its position and shape. Make a drawing of it.

Name the parts of the mouth that form the

entrance; the floor; the roof; the sides, the back part. Which of these parts are movable?

Name three uses of the tongue. Where is it attached? Describe its shape, surface, and movements.



Observe the teeth. How many rows are there? What is meant by the "milk teeth"? the "permanent teeth"? There are twenty teeth in the milk set and thirty-two in the permanent. Find three kinds of teeth. Name the teeth used in cutting, "incisors," from a word meaning to cut; those used in tearing, "canines" (why?); those used in grinding, "molars," from a word meaning a millstone (why?). Which have broad upper surfaces? Make drawings of the three kinds of teeth.

How do all parts of the mouth — the lips, the teeth, the tongue, the cheeks, and the palate — aid in the chewing and swallowing of food?

The food must be made moist as well as fine before it can be swallowed. The fluid that moistens the food is called "saliva." It enters the mouth from its sides and floor. It not only moistens the food, but it causes a change in starchy foods. Chew a piece of cracker, kernels of wheat, or any starchy food. What change do you notice in the taste of the food?

While all parts of the mouth are important in preparing the food to be swallowed, still the teeth are most essential, and it is very important that they should be cared for.

Brush the teeth every morning and rinse them after every meal. Use a tooth powder or paste that has been recommended by a dentist. Twice a year the teeth should be examined by a dentist, and the cavities in them filled. In removing particles of food from the teeth, a piece of floss or silk should be used, as it will clean the teeth thoroughly and with no damage to the teeth or the fillings. — G. H. C.

Write a description of the mouth, telling about the parts and their uses.

Write a description of the teeth, telling their number, kinds, how they are used, and how they should be cared for.

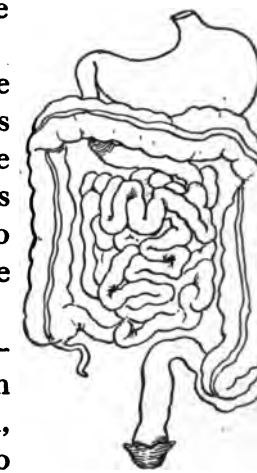
Lesson 61

THE DIGESTIVE ORGANS

Most of the food that man and other animals eat must meet with a great change before it can become a part of their bodies. This change is called "digestion," and the organs by which the

food is digested, or prepared for use in the body are called the "digestive organs."

The digestion, or the changing of the food, in man, begins in the mouth. Here it is moistened and made fine and soft and some of the starch is changed into sugar. From the mouth the food passes down the throat through a tube, called the "gullet," or "œsophagus," into the stomach. The throat is about four inches long and the gullet, nine.



Find in the drawing the stomach. The stomach of an adult is from nine to twelve inches long, about four inches wide, and holds from one to two quarts. Notice where the stomach is placed, its shape, and the openings that lead into it and out of it. The walls of the stomach are soft, easily movable, and very strong.

The food remains in the stomach for a time — sometimes for an hour or two hours, or even three. During that time the food is stirred, mixed, melted, and changed in other ways, so that when it leaves the stomach it is very unlike the food that entered it.

When the food is ready to leave the stomach, a narrow passage opens, and the food passes into the bowels or "intestines." Here the work of changing the food still goes on until

it is ready to be taken up by thousands of tiny filaments, like rootlets, that line the intestines. Through these little filaments, called "villi," the liquid made from the food reaches the blood, by which it is carried finally to every part of the body.

Find in the drawing the intestines. The intestines are divided into two parts, the small (more slender) intestine and the large (wider) intestine. Notice that the small intestine is long and twisted, and leads from the stomach to the large intestine. The food that the stomach and the small intestine cannot change, or digest, passes into the large intestine, from which it is removed from the body.

The work that is going on in your body is wonderful. No chemist can change the food and make it ready for the blood as the stomach and the intestines change it. Silently and easily all the organs do their work without your knowing anything about it. The important thing for you to do is to supply the body with good and needful things, such as wholesome food, pure water, fresh air, and plenty of exercise.

Write two statements about each of the following: the throat and the gullet; the stomach; the small intestine; and the large intestine.

LESSON 62

WHY WE EAT

"WE eat to live" is the saying. A better saying would be, "We should eat that we may live the best life possible." There are four reasons why we eat.

Answer the questions in the following paragraphs:

Can a plant become larger without adding to its material? can an animal? can man? Where does a plant get its extra material? a grass-eating animal? a flesh-eating animal? a fruit-eating animal? man?

State one reason for eating.

Who need the more food in proportion to their weight, growing children or old people? It is safe to say that no young person can grow tall and strong unless he has the right kind of food and enough of it. Bread, meat, milk, eggs, beans, oatmeal and other cereals have flesh food, that is, gluten and albumen, in them that will build up the body.

Can a machine work without wearing out? Mention work that is done by different parts of the body. This work causes constant wear and

waste. We are told that about one-twenty-fourth of the weight of the body is carried off daily as waste by different organs. If the waste were not made good by adding new material, what would be the result? Both flesh and fuel food are needed to repair the waste in body.

State a second reason for eating.

Feel of your hands and your face. Feel of your trunk under the arms. Is the body hot or cold? If a small thermometer is placed under the tongue the temperature will be found to be about ninety-eight degrees. Can you name animals that are warmer than man? Can you name some that are colder? The heat of the body depends in a measure upon the kind of food that is eaten. Name different kinds of fuel food. What kinds of food are eaten in cold countries? in warm countries? in winter? in summer?

State a third reason for eating.

Can a poorly fed man do his work well, — can he think quickly and clearly? Can he do good work with his hands and arms? Can an over-fed man do good work? What about the boy or the athlete that trains for running, jumping, rowing, or some other sport, — must he be careful about his food? The poorly fed pupil, whether he is in the primary grade or in the

high school, cannot do as good work as he could do if he were properly fed. The work that a man or a child is able to do, depends largely on the kind of food he eats. He needs plenty of flesh food to build up his body and also fuel food to furnish heat and power to perform work.

State a fourth reason for eating.

Write two statements about each of the four reasons why we eat.

Lesson 63

THREE THINGS TO REMEMBER ABOUT EATING

The health and the pleasure that come from eating are dependent upon several things:

1. The Kind of Food. The best food is the kind that nourishes the body. Sometimes the cheapest food is the best and sometimes it is the dearest that we can buy, because of what it costs the body. Can you name cheap, wholesome foods? It is poor economy to buy food that costs little, if it is of little or no benefit to the body. Cheap tea and coffee, cheap canned goods, cheap vinegar, stale meats and vegetables are likely to do more harm than good. Other kinds of food to be

avoided are rich cake, and heavy puddings and rich pastry; unripe and over-ripe fruit; salt, pepper, and other spices used in excess. Our food should be fresh, simple, and wholesome. — G. H. C.

Write a composition on Good Food — what it is, what it does, and what it prevents.

2. The Cooking of Food. Recall two reasons for cooking food. Can you think of two reasons why it should be *well* cooked? By *good cooking* we mean plain, delicately seasoned, cleanly cooking, that is neither over-done nor under-done. Cooking is considered so important that it is taught now in many schools as a branch of study. If you have an opportunity either in your homes or at school to learn to cook, be sure to improve it. — G. H. C.

Write a description of the manner in which you have cooked some article of food.

3. The Serving of Food. The serving of food is only second in importance to the cooking of food. One glance at a table tells whether it is inviting or not. It should look clean and orderly. The linen and the china may be coarse, but they should be clean and everything on the table should be in its place. A table neatly and daintily set, having only those things upon it that

are really needed, may be even more attractive than one set in the most costly manner but in poor taste. There should be no haste in the carving and serving of the food. Take time for eating, and make meal-time the pleasantest time of the day. Remember the best sauce for any meat is the cheerful spirit. — G. H. C.

Write a composition telling "How to set a Table" — the things needed, where and how they should be placed.

Lesson 64

THREE MORE THINGS TO REMEMBER

1. The Amount of Food. The amount of food to be eaten depends upon several things, as, the age, the health of the person, the work he is engaged in, and the climate he lives in.

Write statements telling which class of people in each group needs more food: old people or growing children? the sick or the well? farmers or bookkeepers? persons living in a hot or in a cold country?

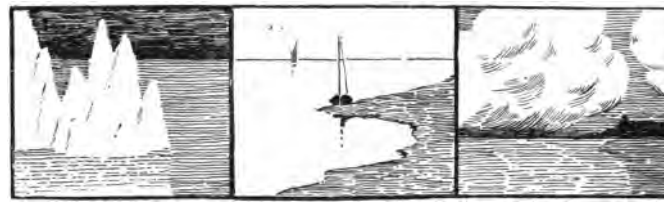
2. The Time of Eating. The best time for eating is at the regular meal-time. If one is very hungry, a light lunch may be eaten between meals

or before going to bed. It is quite safe to say that if three good meals are eaten during the day, no luncheons are necessary and one is very much better off without them. However light the luncheons may be, if they are eaten a short time before meal-time they take the edge from the appetite and keep one from eating the nourishing food that has been prepared for the meal. — G. H. C.

3. The Manner of Eating. The person who eats slowly, takes small mouthfuls, chews thoroughly, drinks moderately, is not only acting in a manner that is healthful and comfortable for himself, but pleasing to others. It has been said, "Let me see a man eat, and I will tell you what he is." The expression "table manners" means doing at the table the right thing at the right time in the easiest manner possible so as to give no offence to others. In the first place, every one at the table should be cheerful and willing to help others; second, hurry and worry must be banished at meal-time.

Write with the help of your teacher, or possibly of a book on table manners, twelve or more directions that a well-behaved person should follow, for example, 1. Be on time. 2. A gentleman allows ladies and gentlemen older than

himself to pass first. 3. Remain standing until all are ready to be seated. 4. Sit at a comfortable distance from the table. Tell in these rules, in a plain, simple manner, all that every well bred person ought to know of table manners. — G. H. C.



THREE FORMS OF WATER

WATER

LESSON 65

WHERE WATER IS FOUND

Name bodies of water on the earth. Name bodies of water under the earth. Turn over a plank that has been lying on soil that looks dry. Is the underside of the plank damp? What does this prove about water in the soil? How do you know that there is water in the air? Have you ever seen it collect on a cold window-pane or on the outside of a cold water-pail or pitcher?

Scrape and squeeze different kinds of fruits and vegetables and notice the amount of water they contain.

Place a plant in a fruit-jar or bottle having

water enough in it to cover the roots of the plant. Mark the height of the water. Pack cotton around the opening of the jar. In a few days observe the height of the water. What has become of the water?

Name some animals that live in the water whose bodies are made up almost entirely of water. Name parts of the bodies of higher animals that are made up largely of water. All parts of the human body contain water. Water forms nearly three-fourths of the weight of our bodies.

Hold over a small lighted stick a cold lamp-chimney or a tumbler. What forms on the inside of the glass? Place a crystal of washing soda or of copper in a dry, cold bottle or test-tube. Heat gradually the lower part of the bottle by holding it over the chimney of a lighted lamp. What forms on the inside of the bottle? What do these two experiments prove?

You will find water in three different forms — solid, liquid, vaporous. Find out the meaning of these new words.

Name solid forms of water; liquid; vaporous.

Write nine statements telling where water is found.

Write a statement naming three forms of water.

Lesson 66

USES OF SOLID AND VAPOROUS FORMS OF WATER

How does snow protect the roots of plants? How does ice on ponds and streams protect the fish? What effect have ice and snow on some impurities in the air? What does snow furnish in the spring? Does the following stanza answer some of these questions?

> "Warmth for all the tender roots,
> Warmth for many a living thing,
> Water for the rivers' flow,
> These the blessings snowflakes bring."

Name benefits of ice to man? Describe the manner in which it is harvested and stored. Freeze pure water, dirty water, and salt water, and notice the difference in the ice from each. Does water, then, always freeze pure? The ice that is used in drinking water or on food should come only from bodies of water that could be used for drinking purposes. Which is the better

way to cool water, to place ice in it or near it? Why?

Name benefits from some of the vaporous forms of water, such as fogs, mists, and clouds. Have you thought how thoroughly and gently fogs and mists bathe all parts of the plant that are in the air; how the clouds sometimes spread out like a tent and protect plants and animals from light and heat when both have been intense? Your teacher will tell you how we owe every form of water to mists and clouds. And yet — what is the greeting of nearly every person we meet on a cloudy day? Knowing the benefit that comes from fogs and clouds, try to forget any unpleasantness connected with them and enjoy them as much as you do the sunshine. — G. H. C.

Write five statements telling uses or benefits of the solid forms of water.

Write three statements telling uses of vaporous forms of water.

Lesson 67

One Use of the Liquid Form of Water

What is the most important use of water in its liquid form?

Observe plants — how they wilt and die without water; how they revive if watered; their strong, fresh appearance after a shower.

Observe animals. Do they all need water? Which can they live without the longer, food or water? A person who values his animals will water them regularly. A person who loves all forms of life, plant or animal, will see that water is supplied them. What provision is made in some homes and in some towns for supplying animals with water? Will you try to think of this need of animals?

The body of man is made up largely of water. As he lives and works the water is used up, and fresh water must be supplied. The body needs two or three quarts daily. One third of this amount is usually contained in the food and two-thirds in the liquids that are taken into the body.

It is very important that the water used for drinking purposes should be pure. Water is noted for its power to dissolve substances.

Dissolve salt, sugar, alum, and other substances in water.

Notice how clear the water is in many cases after something is dissolved in it. So the clear, sparkling appearance of water is no proof that it

is pure. Because the water dissolves salt, sulphur, lime, and other substances out of the soil and rocks, we have salt water, mineral water, and hard water, that is, water with lime and other hard, or mineral, matter in it, and we have also water that is impure with animal and vegetable matter.

Water that is free from hard, or mineral, substances is said to be "soft." Rain water is soft water, but it is not always pure. It washes impurities out of the air and from the surfaces on which it falls, so that we cannot always depend upon it for drinking purposes.

Hard water is sometimes made soft by boiling it. Some impurities in water are killed by boiling the water ten or fifteen minutes. Water is also distilled for drinking purposes, that is, the water is boiled and the steam, instead of being allowed to escape into the air, is cooled and collected as water. Water that is boiled or distilled may be cooled by bottling and placing it on ice.

Do you think it is better to take the water in a pure form as the beautiful, healthy plants and strong animals do, or mixed with some article that does not benefit the body?

Write three statements about the most important use of water in the liquid form.

Write three statements about three different kinds of water.

A Reading Lesson

NATURAL DRINKS

It is important to think what a wonderful amount of life and of work is carried on, and what varied work is done, on simple water by other animals than man. With what speed some birds can fly, some horses gallop; to what heights some animals, such as the deer, can leap; what weights some animals, such as the elephant, can carry; what amount of exercise a dog can go through, and what intelligent tasks it can be taught to perform. The fleet camel can walk and carry its rider fifty miles a day, and can exist in the desert for days, supplied with the water it carries in great water-cells, or pouches, in its body. All the animal kingdom, indeed, mammals, birds, fishes, reptiles, insects, animals that can be seen only with a microscope, — all this vast world of life, extending from the Polar seas to the heated tropics, in the sea, in the air, — all these myriads of forms of living motion can go

through their destined tasks, their sports and works, having as their drink nothing but water. — *Dr. Benjamin Ward Richardson.*

Lesson 68

DRINKING WATER

Water for drinking is ordinarily taken from wells, ponds, lakes, and rivers. Great care should be taken in locating a well that it may not receive drainage containing any impurities.

What is the objection to locating a well on lower ground than the house or the barn and other out-buildings? What is meant by a "driven well"? A well that has been dug in the earth is called "sunken." Do you know of any such wells? Why should the sides of a "sunken" well be cemented or stoned? Why should the surface about the well be raised and paved? Why should the top be kept covered? Which is better, then, a driven well with its iron pipe and pump, or the old-fashioned well with its "moss-covered bucket"?

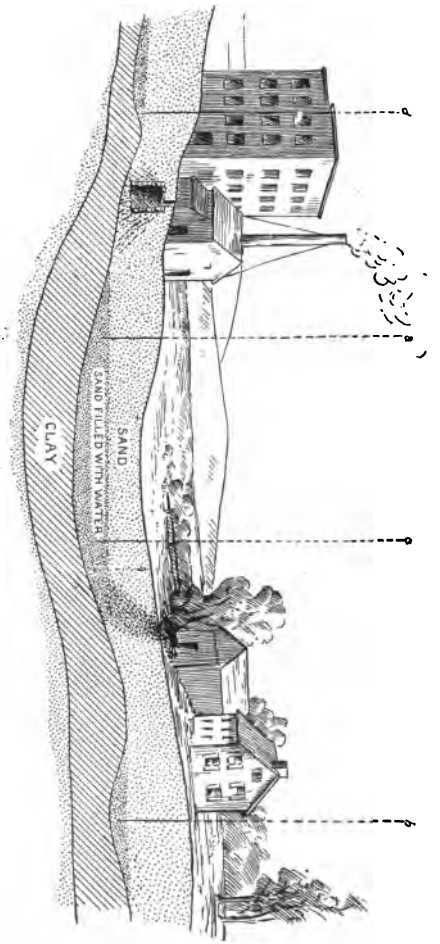
Sometimes the water in a well is cut off from the surface soil by a hard rock layer. Why is the water in this well more likely to be pure?

Study the picture on the opposite page. What is the first layer of earth below the surface? the second? Can water pass through sand? Can it pass through clay or rock? Then the water that falls on the surface of the earth passes through the sand, settles on the layer of clay or rock, or flows along its inclined surface until it reaches a hollow.

Notice where buildings are placed and that the drainage that comes from them finally reaches the water. Dotted lines show where wells might be driven. Would a well located at *a* be pure? at *b*? at *c*? at *d*? Give reasons for your answers to the last four questions.

Observe the location of wells in your town or neighborhood. Notice whether they are placed so as to receive drainage from buildings or farmyards; whether they are dug or driven, shallow or deep; covered or uncovered.

Most cities use water from lakes or rivers. These often receive drainage from towns, factories, and cultivated lands, so that the water is very impure. The water is stored in reservoirs and made to filter through immense beds of gravel and sand, called filter-beds. By this method many of the impurities are taken from the water. Some people do not like to drink


CLAY
SAND
SAND FILLED WITH WATER

this water, however, and a large business is done in bottling and selling water from springs that are known to be pure, but which are often located many miles from the cities supplied.

Good drinking water should be cool, clear, without odor or taste, sparkling, not too hard, and free from animal and vegetable matter. Have you such water in your locality? If you have not, you are denied one of the greatest pleasures of life — the pleasure of drinking freely of pure, cold water.

If one is warm, ice-cold water should not be drunk in large quantities. If used at all, it should be sipped slowly, a very little at a time. — G. H. C.

Write three statements about the location and the structure of a well.

Write two statements about the water from lakes and rivers.

Write a description of good drinking water.

Lesson 69

WATER FOR CLEANSING PURPOSES

The first use of water is for drinking purposes. The second use is of almost equal importance, and that is, for cleansing purposes, which include

bathing and the cleansing of houses, clothing, and paved streets.

Recall what was learned about the bath when studying the skin — the reasons for the bath; the kinds of baths; best time of day for the bath; and other topics relating to the bath. (See Lesson 30.)

Describe how a house should be finished and furnished so that it can be kept clean. A house cannot be kept clean without the use of water. Hardwood floors and unpapered walls and ceilings admit of washing and are, therefore, desirable.

Some of the dirt in rooms can be seen and some of it is invisible. Whether we see it or not, it is often there, clinging to the walls, woodwork, draperies, and furniture. Every breath we exhale throws a little dirt on the air in the room; sickness adds a great deal to the dirt of the house; dirt is constantly coming in from the outside; cooking and activity of all kinds make dirt. Is it any wonder, then, that the housekeeper feels that there must be a weekly "cleaning-day;" that once a year everything must be taken out, shaken, and aired, and hot water applied to everything that can be washed?

Tell why clothing should be simply made. The clothing of young children should be made

of material that can be washed. This should be true also of as much as possible of the clothing of older people. The air in school-rooms and in other public buildings cannot be kept pure and sweet unless the clothes as well as the bodies of people are clean. The outside clothing that cannot be washed should be changed often, shaken, and hung in the air and sunshine. Air, sunshine, and water are the great purifiers of clothing and of rooms. When clothes and surroundings are clean and sweet, there usually result health, comfort, and happiness. — G. H. C.

Write a statement telling several causes of dirt in the house.

Write two statements telling about cleansing the house with water.

Write two statements telling about cleansing clothing with water.

Lesson 70

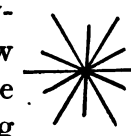
THE BEAUTY OF WATER

We have learned that water is useful. It is also beautiful. Seeing and feeling the beauty of things is almost as valuable as knowing their use. Keep your eyes ever open for the beautiful

sights produced in nature by the different forms of water.

Watch a brook at different seasons of the year, or any body of water that may be near you. Look for water sparkling in the sunlight and the moonlight; reflections of trees and sky in the water; water roughened by the wind or by falling over rocks; spray in the sunlight; dew-drops and rain-drops on the grass and the leaves.

Notice in winter the solid forms of water and their rare beauty. Place in a mixture of salt and ice a small bottle containing water. Watch the water as it freezes, and notice the graceful leaves and slender pencils that form first at the sides of the bottle. Examine snow-crystals. Have they different forms? How many points are there on each crystal? Notice the frost on the grass and the trees, sparkling like millions of gems; the beautiful scenes on the windows traced by Jack Frost; the sunlight on icicles; the whiteness of the fields and the trees after a snow-storm, and the drifts and waves and hollows formed by the wind; the woods in winter when the ground is white and the trees look black; the breaking up in the spring of ice-bound streams.



Notice the clouds as they form; their differ-

ent shapes; their colors; their glory at sunrise and sunset.

Listen for the different sounds caused by water — the tapping of the drops on the roof and the window-panes; the murmuring and the chattering of brooks; the merry tinkling of falling water; the lapping of the waves; the roar of the surf. Read "The Cataract of Lodore," by Southey. How the author must have watched the water and listened to it!

Find poems that describe some forms of water, such as Whittier's "Frost Spirit," Longfellow's "Rain in Summer" and "The Brook and the Wave," and Bryant's "Green River" and "Snow-Shower." Read these poems and commit stanzas to memory.

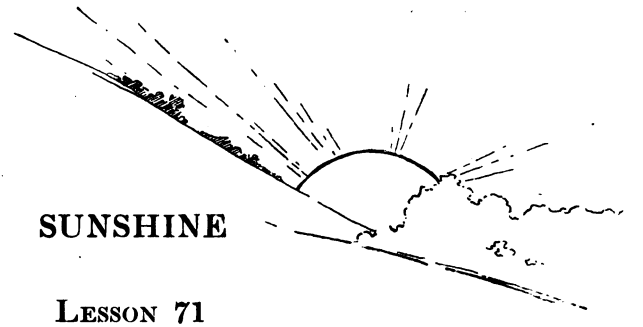
If you have Andersen's "Fairy Tales," read the pretty descriptions of snow scenes in "The Snow Man," "The Snow Queen," "In the Uttermost Parts of the Sea," and "The Ice Maiden."

Write a description of water as you have seen it in spring, summer, or fall.

Write a description of water as you have seen it in the winter.

Write a description of clouds that you have seen.

Copy a favorite poem that describes one of the three forms of water.

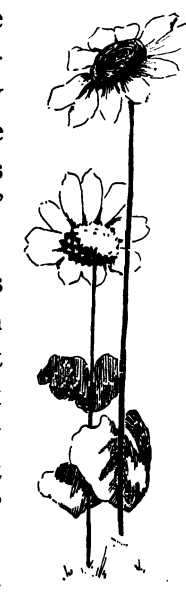


SUNSHINE

Lesson 71

A FRIEND TO LIVING THINGS

You look for the sun as for the face of a friend. The first question you ask in the morning is, "Does the sun shine?" If it suddenly breaks through a cloud on a dark day some one cries, "There's the sun!" One of the finest compliments that can be paid a person is to say of him, "He brings sunshine with him." What is the meaning of such a remark?



Even the plants show their friendliness toward the sun. Have you seen flowers turn their faces toward it in the morning and follow it in its course all day? How does a plant look that is kept down cellar or in a dark place away from the sunshine? How does the same plant change if it is brought up into the sunshine? Why do plants thrive best in a south window?

Nearly all the higher animals love sunshine. How do they show that they love it?

The sun not only brings light, warmth, and beauty, but it purifies the air and everything that it shines upon. As you have entered a room into which the sun was shining you may have noticed the clean, refreshing odor in the air. The soil about our houses is cleansed of some of its impurities if the sun's rays can reach it. Carpets, bedding, draperies, clothing may all be cleansed to a certain extent by hanging them in the sunshine. The sun, then, shining into our homes is a great cleansing agent, and more than this, the dirt it cannot remove, it plainly reveals. It is really our friend against all kinds of dirt.

You will learn some day that it is the great power-house of this earth and of other worlds. Whether we know much about the sun or not, we can all enjoy the sunshine.

Copy and learn the following stanza:

> And look at the broad-faced sun, how he smiles
> On the dewy earth that smiles in his ray,
> On the leaping waters and gay young isles,
> Ay, look, and he 'll smile thy gloom away.
>
> BRYANT.

Write a description of an incident showing that people enjoy sunshine.

Write a description of an incident showing that plants thrive in the sunshine.

Write a description of an incident showing that animals like sunshine.

Describe a landscape in the sunshine. Tell of some beautiful sight in nature caused by the sun shining on clouds, fields, or woods.

LESSON 72

SUNSHINE IN BUILDINGS

Name the rooms in your home that usually receive plenty of sunshine. Name those that receive but little. Name those that receive none at all.

Tell why the "living-room" should be the lightest, most cheerful room in the house. In what direction would you like the living-room to face? Should the windows be large or small? Why should they be made to open at both top and bottom?

Read this description of an old-fashioned parlor by Washington Irving: "The front door was never opened except on marriages, funerals, New Year's days, or some such great occasion. The grand parlor was the sacred apartment that no

one was permitted to enter except the mistress and her maid. After the weekly cleaning the wooden shutters were tightly closed to keep out the flies, and the room carefully locked up till the weekly cleaning-day came round again."

Do you think the old-fashioned parlor was a healthful or an unhealthful room? Why do you think as you do?

Since closets usually receive no sunlight, what should be done often with the articles in them?

Tell why sleeping-rooms should be on the second floor; why they should be on the sunny side of the house; when the windows should be thrown wide open. The morning, sunlighted air is the best of the day — capture as much of it as possible.

Tell why cellars, too, should have sunshine. Then the cellar should have windows, and its ceiling should be higher than the level of the ground outside.

Name public buildings that should be open to the sunshine.

Find the meaning of the word "solarium."

How should barns, stables, poultry-houses, and other buildings for animals be built with reference to the sunshine?

Tell where trees must be placed in order that

sunshine may reach buildings, — near the buildings or at a little distance. For the sake of health and beauty, should the trees be trimmed high or low? Should streets be wide or narrow, especially in cities? Why?

Look at the picture on page 172, and answer the following questions: Does the place look sunshiny and pleasant? Are there trees? Where are they placed? Is there a wide lawn? Does it slope from the house? Is the house high? Is the foundation high? Are the blinds open? Is the garret lighted? Altogether, do you think the house is pleasantly and healthfully located?

Are there some homes where sunlight never enters? Are there some countries that have sunlight only part of the year? How do the people look who live in these homes and countries?

Write a composition on "Sunshine and the Home." Tell about the location of the home — the street and the trees with reference to sunshine; the need of sunshine in the different rooms and the best means of getting it.

A House Open to Sun and Air

Lesson 73

GIFTS FROM THE SUN

"Now what shall I send to the earth to-day?"
Said the great, round golden sun.
"Oh! let us go down there to work and play,"
Said the Sunbeams, every one.

POULSSON.

Let us trace some of the necessary things of life back to their origin and discover some of the work that the sun does.

Name the two kinds of food that man eats. Are plants dependent on the sun for life? Are the animals that man eats dependent on plants for life? Is man, then, dependent on the sun for his food?

Name materials of which clothing is made. Show how man is dependent on the sun for his clothing of cotton, linen, wool, or silk.

Name different kinds of fuel. Is man dependent on the sun for coal and wood? Perhaps your teacher can tell you why coal has been called the "crystallized sunbeams" of long ago.

We find, that we are dependent on the sun for all the necessaries of life — light, warmth, food, clothing, and fuel. Is it any wonder that

people of former times, seeing the gifts that came from the sun, worshipped it?

Show how work done by hand-power is dependent on the sun. On what does man depend for his strength? Can you show how work done by steam-power is dependent on the sun?

Name industries that are dependent directly upon the sun's rays, as farming, bleaching.

The heat from the sun dries the earth and causes the moisture to rise in the air and form clouds. Then the rain falls. Thus the sun dries the earth and waters it in turn.

Think of the amount of work done in nature by the sun during the different seasons, and of the swiftness, silence, and steadiness with which it works until the fields of ice and snow are changed to brilliant green.

Write a description of a place as it looks at different seasons of the year, owing to the work of the sun.

Read "The Story of the Year" in Andersen's "Fairy Tales."

Find and report to your teacher the number of poems on sunshine or sunbeams that you have read.

Find several in Longfellow, Whittier, and Bryant.

Write two statements telling how man depends upon the sun for food.

Write two statements telling how man depends upon the sun for clothing.

Write two statements telling how man depends upon the sun for fuel.

Write two statements telling how power that does work comes from the sun.

Write Good Health Club rules relating to the following:

1. Throwing open the living-room and sleeping rooms daily to sunlighted air.

2. Putting bedding and clothing in the sunshine.

3. Breathing deep breaths of sunlighted air. (Practise Nos. 8 and 9 Breathing Exercises, page 125.)

A Reading Lesson

THE SUNBEAM

Thou art no lingerer in monarch's hall —
A joy thou art, and a wealth to all!
A bearer of hope unto land and sea —
Sunbeam! what gift hath the world like thee?

Thou art walking the billows, and ocean smiles;
Thou hast touch'd with glory his thousand isles;
Thou hast lit up the ships and the feathery foam,
And gladden'd the sailor like words from home.

I look'd on the mountains — a vapor lay
Folding their heights in its dark array:
Thou brakest forth, and the mist became
A crown and a mantle of living flame.

I look'd on the peasant's lowly cot —
Something of sadness had wrapt the spot;
But a gleam of thee on its lattice fell,
And it laugh'd into beauty at that bright spell.

HEMANS.

CLOTHING

LESSON 74

THE USES OF CLOTHING

Recall how the bodies of animals are protected on the outside. What did you learn were some of the uses of their coverings?

You learned that the skin of man fits the body and yields to every movement; that it is adapted to its use in every way; that it is thick in some places and thin in others; smooth and firm in some places and loose and wrinkled in others; that it is full of tiny holes, or pores, through which moisture may pass.

The clothing should serve the same purpose as the skin. It should protect the body from heat, cold, dirt, and injury; it should be light in weight so as not to be a burden; well-fitting, but loose and comfortable so as not to hinder the body in any of its movements; and of a material not so closely woven but that air and moisture can pass through it.

You are to study three topics relating to clothing, — first, the material of which it is made; second, the manner in which it is worn; third, its care.

The following experiment will help you to understand the first topic:

Place a thermometer on different materials in the room, as wood, iron, brass, marble, glass, and prove that they have the same temperature. Place your hand upon them. Do they feel equally warm? Which one feels the coldest? Which the warmest?

Feel of paper, leather, rubber, cotton cloth, linen, woollen cloth, silk. Write these names in order, according to the feeling of the materials, placing first the name of the one that feels the coldest.

The question is, — why do some of these materials feel colder than others? The hand is warmer than any of these materials that you have touched and they take the heat from the hand. Some materials take the heat more rapidly than others. Iron takes the heat from the hand more rapidly than wood does, so we say that iron is colder than wood, but it is not, as you can tell by the thermometer; it only feels colder. Why does woollen feel warmer than cotton, and cotton

than linen or silk? During what season ought materials to be worn that take the heat from the body slowly? That take the heat rapidly?

Write a statement telling in what respects the clothing should be like the skin.

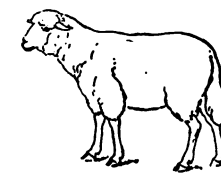
Write statements describing the experiments and telling what you learned from them.

Lesson 75

THE MATERIAL OF CLOTHING

Write a list of names of materials that are used for clothing.

Write a statement about each, telling whether it comes from an animal or a plant.



Write the names of materials that are used for winter clothing.

Write the names of materials that are used for summer clothing.

What is one reason why each of the materials is suited to its season?

You will be surprised to know that air helps to clothe you. Dry air does not take heat from the body rapidly, and layers of air between layers of clothing serve as extra blankets. For this reason several thin garments are warmer than

one thick one of the same weight, — there are layers of warm air between the thin garments.

Tell, then, which are the warmer — materials that are closely woven or those that are loosely woven (providing there is no wind); loose garments or tight ones; new or old material; clean or soiled clothing. What makes fur so warm? Which of these materials or garments are best for winter wear?

In summer we need clothing that not only allows the heat of the body to pass off, but that also reflects, or throws back, the heat of the sun. This last quality depends upon the color of the material. What color is worn largely in summer and in warm countries? This is the coolest color that can be worn in summer, because it reflects nearly all the sun's rays. Yellow is the next coolest, then green.

Some materials can hold a large amount of water without feeling wet. Dampen pieces of woollen, cotton, linen, and silk. Which feels the coldest and dampest? which the warmest and driest? Which material would you prefer to wear in both summer and winter if the climate were damp?

Find materials that are open in their texture and weave. Such materials will allow the moist-

ure of the body to pass off freely, and should be used for clothing. India rubber and oilskins are almost air tight. When are they useful? When should they not be worn?

Write three reasons why woollen materials are suitable for winter.

Write two reasons why white linen or cotton is suitable for summer.

Mount samples of goods that are suitable for summer wear; for winter.

Lesson 76

THE STYLE AND THE CARE OF CLOTHING

Name parts of the body that are often cold. **Name** the parts that are the warmest. Which parts are most sensitive to cold? Care should be taken to clothe warmly not only the trunk but also the legs and feet.

At all seasons the clothing should be as light as possible, while supplying the right amount of warmth. When the shoes are well fitting, light and warm, one walks with ease. Light hats, light underclothing, and light outside garments, all add to the health and comfort of the wearer, and should be chosen when the weather permits one to wear them.

The shoulders are well fitted to bear burdens, and, so far as practicable, all parts of the clothing should be supported by them, such as stockings, trousers, skirts, and combination underwear.

Clothing should be loose, but well-fitting. A person who wears such is at his best, so far as his clothes are concerned. He is comfortable and has a sense of freedom, working and playing easily and, as a rule, gracefully.

Beware of all props and stays for the healthy body — such as stiff shoes to support healthy baby ankles that need only a chance to exercise and grow strong; braces for backs and shoulders of growing boys and girls that may be made straight by exercise and proper training; corsets for the trunk that can hold itself erect if the muscles are only allowed to do their work and become strong. Every part of a healthy body, from the ankles to the shoulders, is able to support itself. All it needs is a chance to move and work and carry itself properly.

In regard to the style in which clothes are made, the first thought should be to have them simply and neatly made, and suited to the time and the place of wearing them. If possible, the style of clothes should be pleasing to others and agreeable to the wearer.

No matter how rough and dirty the work or play is, a little time should be spent every day in caring for the clothes.

State four reasons why clothing should be clean.

State two reasons why clothing should be dry.

Tell why clothing, especially woollen, should be changed frequently.

Tell why every article worn through the day should be removed at night.

Tell how the clothing should be cared for on removing it at night.

Describe the place one should have for putting away in order the clothes that are not being worn.

Write a statement on each of the four topics that you think the most important that you have studied in this lesson.

Write Good Health Club rules on the following topics:

1. Clean clothing.
2. Complete change of clothes at night.
3. Brushing clothes daily.
4. Loose clothing.
5. Light weight clothing.
6. Support of clothing from the shoulders.
7. Simple, neat style of dress.

WORK AND REST

Lesson 77

REST FOLLOWS WORK

During the day all is life and activity. It is the business of living things to live, and in order to live, they must work. Then follows night, when these busy creatures rest.

Observe various living things and you will find that they have times for work and times for rest.

What animals do you see at work in the daytime? What birds and insects do you hear? When do all these animals rest? Can you name wild animals that rest during the daytime and hunt for food during the night? Can you name birds that do the same? Can you name insects?

In the fall some animals, as bears, woodchucks, frogs, snakes, bats, flies, spiders, and many birds, hide in their dens or in protected places and sleep until spring comes. Some animals, such as the squirrel and the field-mouse, go

to sleep, but wake up occasionally during the winter and eat of their winter stores of nuts and grain.

Do the trees look dead in the winter? Are they dead, or have they only stopped working? When will they wake up and the sap begin to flow and the tree to grow? In the nighttime most plants are not so active as in the daytime. When the sun is shining plants are ever busy taking something from the air and water for food. When it is dark they do not work in this manner.

If you observe living things closely, you will find that even during its period of work nothing works steadily, but that everything works and then rests a little. Even things that are not alive wear out quickly if they are used constantly. The locomotive on the fastest train in the world runs about one hundred and fifty miles and then there is a change. What would be the result if an engine ran steadily all day, and day after day, at a high rate of speed? On the other hand what would be the result if it stood idle for a long time? What would be the result if the engineer ran the engine, but failed to care for it?

The human body is a wonderful machine and

what is true about the engine is true about the body. If it works steadily without rest it wears out; if it does not work at all it gets badly out of order; if it is not cared for or its parts are not used properly the work done by it will be of an inferior kind.

Tell, then, the conditions under which man will do his best work.

You may think that there are some parts of the body that are always at work, but if you study closely you will find that no part of the body is naturally under a steady strain. The heart beats and then for a brief pause rests; the lungs inhale air, exhale it, and before another breath is taken there is an instant's rest. By some nice arrangement every part works and then rests.

Write two statements telling how animals work and rest.

Write two statements telling how plants work and rest.

Write two statements telling when man will do the best work of which he is capable.

Lesson 78

THE MANNER OF WORKING

Search the world over and you will find that the healthiest, happiest people are those whose time is partially filled with hard work, done by either their muscles or their brains, or by both. Even a baby must work in order to grow. How does it work? Watch the movements of a baby's limbs.

Name classes of workers who work chiefly with their muscles. Name some that work chiefly with their minds. Workers of any trade or profession must have rest from their work. They frequently find it in a change of work. The man who works with his muscles may find rest, not in sitting perfectly still, but in reading, music, or some light amusement, while the man who does mental work may find rest in an outdoor game or moderate exercise.

Work, or exercise, must be of such a kind as will give all parts of the body a chance not only to act, but to act in the right manner. People who work hard often say: "I work hard enough every day; I don't need any exercise."

Ask these three questions about the work

of some of these and determine whether what they say is true or not. Is their work done in the open air? In doing it, is one part only or are many parts of their bodies used? Are the parts used in the right manner, and are their bodies kept in a position that tends to health? If the daily employment of people does not give them exercise in the open air and bring all parts of the body into healthy action, and the body into a healthful position, then those exercises should be taken which supply what the daily employment fails to give.

I can think of a person who has an erect figure, whose body is strong and well developed, who has active limbs, a broad chest, and a glowing skin, who breathes deeply, and whose heart-beats send health and strength to every part of the body. Can you think of such a person? Does he lead an active life? What parts of his body are active? Is he fond of outdoor exercise?

Write a description of this person that you think of and of his manner of working and exercising, without naming the person.

Find a picture of a work of art that represents a well-developed human figure, and mount it in your blank-book.

Lesson 79

EXERCISE AND GAMES

Name several kinds of outdoor exercise that are healthful for both young and old people.

State three reasons why walking is a good exercise.

Walking every day for exercise and for pleasure is a fine and healthful habit which should be formed early in life. Old and young would do well to take time for the daily walk. In order to enjoy walking, one must dress suitably. The clothing should be light, not too warm, and should allow the limbs to move with entire freedom. The shoes, especially, should be perfectly comfortable. Take the daily walk whether you have an errand in view or not. Walk for the pleasure of walking and for the new and interesting knowledge that you can gather during the walk. Make walking an exercise for the senses as well as for the muscles — see everything worth seeing, hear the interesting sounds, smell the delightful odors, and notice the touch of the air. Lengthen the walk gradually, and soon you will think nothing of walking several miles. As you grow older one of the chief pleasures of your life will be your daily walk. — G. H. C.

Rowing is a good exercise for both grown people and children. What parts of the body do the hardest work in rowing?

Swimming is excellent as an exercise, and may be of great value sometime in saving life. Children learn to swim easily and quickly in salt water, especially if they are aided at first by the air-bags called "Water Wings." It is a very simple matter to float and keep one's head above water, but not so easy to make the strong strokes that take one swiftly through the water. It is these strokes that make the muscles of the back and the chest strong. In swimming, as in any other exercise, there are dangers to guard against. Such are—going into the water when the body is overheated, or directly after a meal; remaining in the water too long, or not exercising while in the water.

Bicycling is an exercise suited to all ages. Only animals lower than man use the fore limbs to support the body. Remember this in wheeling and hold the trunk erect, but not rigid. Allow the hands to rest lightly upon the handle-bars for the purpose only of controlling the wheel. never of supporting the body.

Tennis may be played by both old and young. In playing this game, one must run, reach, spring,

stoop, and also *stand* and *wait*, keenly alert and watchful. It gives exercise, not only to every part of the body, but to the mind as well. It is a game that calls for coolness, quickness, skill, judgment, and, as do nearly all games, for patience and perseverance.

Nearly all games may be played in a manner that will make them beneficial to the players. There are some sports, such as football, bicycle racing, and others, that may do more harm than good, because of the manner in which they are played. Cautions might be given for playing any game. Running, jumping the rope, wrestling, and even tennis, all have their dangers to be guarded against. The object of all games should be to *train* and not to *strain* the body.

Gymnastic drills that are used in schools, while they cannot take the place of outdoor games, are as valuable in many ways as the games. When you are full grown you will never cease to be thankful that you were trained, perhaps in school, to stand erect, walk lightly and easily, stoop and rise correctly, and carry and use all parts of the body in the right manner. Every kind of exercise, taken moderately, has its value and tends to give one a strong, active, graceful body.

Write a description of a walk that you have taken — telling the time of day when you walked, the distance, and the things seen.

Write a description of how you learned to swim.

Write a description of the outdoor game that you like best, telling the number of players necessary, the things that you use in playing the game, and how the game is played.

Lesson 80

THE MANNER OF RESTING

For children short periods of work should be followed by short intervals of rest. There should be frequent change. As people grow older, their periods of work should grow longer; they can apply themselves longer to one kind of work without feeling tired. During the daytime, rest means usually a change of work or exercise. Pupils who have been studying hard often rest by singing, marching, or having some kind of gymnastic exercises. Men and women who have been sitting quietly, working indoors, find rest in working in the garden, taking a walk, or in playing some outdoor

game. Sometimes, however, rest means to sit or to lie perfectly quiet.

Remain perfectly quiet for several minutes. This is not so easy to do as one may think. We are like clocks that are always wound up tight and want to keep continually running. It is a good practice to stop work once during the day and rest by sitting perfectly still. When you rest in this manner, practise the following: Make no effort to hold the trunk or the head erect; let the shoulders droop, the arms hang from the shoulders, and the hands rest in the lap; let the feet rest on the floor; unclose the jaws so that the teeth do not clinch, and let the tongue drop down from the roof of the mouth. Tell every part of the body over which you have any control to "rest." Make the rest that you are trying to give the body as complete as possible. Learn early in life to do nothing "by halves." When you work, work; when you play, play; and when you rest, rest. Whatever you do, do thoroughly, and do but one thing at a time.

When does the body have natural rest?

Name four causes that may prevent sound sleep. Who need the more sleep, children or old people? A growing boy or girl needs nine or ten hours of sleep. Which is the better time

for sleep, nighttime or daytime? Name a proper hour for retiring and for rising. — G. H. C.

Special effort should be made to have everything about the sleeping-room comfortable and restful. Fancy articles and bric-a-brac are out of place in a sleeping-room. The furnishings should be plain, neat, and simple; the room at night should be dark, quiet, and well ventilated; the springs, mattress, and pillow should be comfortable, and the bed-clothing warm, clean, and light in weight. In order that sleep may be sound and restful, three things are necessary, — the feet should be warm, the hunger satisfied, and the mind free from all thoughts of work and worry. — G. H. C.

Write a description of a sleeping-room and tell how it should be cared for.

REST

Rest is not quitting
The busy career;
Rest is the fitting
Of self to one's sphere.

'T is loving and serving
The highest and best;
'T is onward, unswerving,
And this is true rest.

GOETHE.

MISCELLANEOUS

GETTING IN TRAINING

TEMPERANCE TEACHINGS[1]

LESSON 81

OPINIONS OF ATHLETES

A VAST amount of work is being done in the world at present. Yet a still greater amount might be done were it not for two foes that rob many of the workers of their strength. It is a mistaken idea that tobacco or alcoholic drinks enable a man to do more or better work than he would do without them.

Men or boys training to win a prize in running, jumping, rowing, or in any sport, are not allowed to use either tobacco or alcoholic drinks. It is a well-known fact that they cannot do their best work unless they let these things alone.

Notice the opinions of the following athletes: Weston, who walked five thousand miles in one hundred days; Hanlon, at one time champion oarsman of the world; Goodwin, who cycled more than two thousand miles in nineteen days; Holbein, who cycled three hundred and twenty-four miles in one day; Frank L. Kramer, national

[1] See "Lessons on the Human Body," p. 185. A. S. Barnes & Co.

amateur cycling champion of America, 1898, 1899; M. F. McBride, Captain of Yale Football Team of 1899; Charles E. Courtney, coach of the Cornell crews; — all have said that an athlete should abstain from alcohol and tobacco; that even when used in the most moderate degree they lessen power to work.

Weston once said at a public meeting that he had walked twice the circumference of the earth, and had proved that a pedestrian could walk farther by relying on his natural strength than by dosing himself with stimulants. Hanlon, the oarsman, gave his opinion that the best work could be done only by abstaining entirely from the use of tobacco and alcohol. Parton said: "One of the first things demanded of a young man who is going into training for a boat-race is, 'Stop smoking.' He will feel the effects of smoking even one inch of a mild cigar. No smoker who has ever trained severely for a race or a game of any kind needs to be told that smoking weakens his strength, — he knows it."

Dr. Martin, of Johns Hopkins University, said: "A man who, after election as a member of his college crew, should be found secretly drinking beer or smoking, would be hissed out of college."

LESSON 82

OPINIONS OF WORKMEN

THE following workmen have given their experience:

A blacksmith said: "Whatever I could do before on beer, I can do ten times better on water."

An iron-moulder said: "I do my work with greater ease on water than I ever did on beer, and give better satisfaction."

A sewer-flusher said: "It was a long time before I could bring my mind to give up strong drink, thinking it was needed for my work underground. I found I could do better without drink than with it."

A brass-founder said: "Since I left off drinking I have never been a day ill. I have done double what I did before, and in every respect am in better condition than before."

At one place in England, where much bricklaying is done, a record was kept of the amount of each man's work, the number of days lost by sickness, and the deaths occurring among the men. The rules of the service allowed to every man a mug of beer at each meal. There were

several among the workmen who did not use any alcoholic drinks, not even beer. The record showed that the amount of work done by the beer-drinkers was much less than that done by those who did not drink, while the number of days lost by sickness was greater.

A shipmaster told this tale: "When I was a lad before the mast, I had an adventure that I have never forgotten. It was winter, and we were off a rocky lee shore with a tremendous storm upon us. We tacked off and on, and with every tack we had to break the icicles off the ropes, it was so fearfully cold. Of course, the first thing to be done was to serve out gin. This made the men work well a little while after each drink, and then they would flag and call for more gin. Gradually they grew worse, and finally they could not be made to work at all. Before morning every one of them was laid up helpless. I did not drink, and there were two lads with me whom I persuaded not to drink. We were the only ones who could do anything, and it was all we could do to keep the vessel on her way until the storm was over. If we had drunk with the rest, we should all have gone to the bottom together, — there was no possible help for it."

LESSON 83

OPINIONS OF SCIENTISTS

SIR John Ross, the famous Arctic explorer, said: "It is quite remarkable to observe how much stronger and more able to do their work the men were when they had nothing but water to drink."

Dr. Parkes made three soldiers march twenty miles a day for six days, loaded with gun, knapsack, pouch, etc. They had the same food every day, but on two days they drank brandy and water, on two, coffee, and on the other two, weak beef tea. All three found that, though the brandy revived them for a little while, they were more tired at the end of the journey on the two days when they took brandy than on any of the others.

Dr. F. W. Pavy, of England, tells of an experiment with a soldier. He was given a certain amount of work to do, first, when he was entirely free from the effects of alcohol, and, second, when he was taking measured doses of brandy. The result was as follows: the brandy seemed to give him a kind of spirit which made him think he could do a great deal of work, but

when he came to do it, he found he was less capable of work than he thought.

Alcoholic drink has been called a false friend, and it is well named. It makes people think they are warmer, when really they have less power to resist the cold; it makes the workman feel stronger without giving him any real strength; it makes him think he is working more rapidly, when he is really working more slowly. Writers and speakers have found that sometimes they could write and speak more readily after drinking a small amount of alcohol, but they also learned that rapid work did not usually mean good work. Alcoholic drinks may give a certain kind of courage, but it is a courage that counts for but little if good judgment is required, for they take away the power to judge clearly. Finally, if used to excess, a thirst is awakened by the use of these drinks that nothing can quench. Thus alcoholic drinks appear to do what they do not do. Has it not been truthfully said that whosoever is deceived by them is not wise?

Write the statements of two athletes in regard to the effect of the use of alcoholic drinks.

Write the statements of two hand-workers.

Describe an incident showing the effect of alcoholic drinks on soldiers.

LESSON 84

THE NATURE OF ALCOHOL

AFTER hearing so much about alcoholic drinks, one might naturally ask: "What is alcohol? How does it look? Is it of any use whatever?"

Look at alcohol and you will find that it looks as innocent as water. You will see that it is as clear and colorless as water. It is lighter than water and flows more easily. If you smell of it, you will find that it has a peculiar, penetrating odor. If a few drops are placed on your hand, there will be a feeling of coolness and then of warmth. If you expose alcohol and water to the same amount of heat you will find that alcohol evaporates much more quickly than water. Water boils at 212° F.; alcohol, at 173° F.

Alcohol has its uses. Can you dissolve camphor, resin, shellac, or oils in water? Try to dissolve some of them in alcohol. Why does alcohol remove grease spots? How is the fragrance of flowers preserved by alcohol?

Put a teaspoonful of alcohol into a saucer.

Apply to it a lighted match. Notice that it burns with a blue flame, giving off much heat and little smoke. Find out where alcohol lamps are used.

Pour alcohol on a piece of meat and the white of an egg. Does it harden them? Perhaps you have seen specimens of animals preserved in alcohol. Alcohol has an attraction for water and takes it from any substance with which it comes in contact. For this reason it is almost impossible to obtain absolutely pure alcohol. What is commonly sold by druggists as strong alcohol contains about five parts of water.

While alcohol has its uses and is valuable in the arts and sciences, its effect upon living bodies is usually injurious. If taken in sufficient quantities, it causes death. The beverages containing alcohol are injurious according to the amount of alcohol in them; some of them are three-fifths alcohol.

Write six statements describing alcohol.

Write four statements telling the uses of alcohol.

LESSON 85

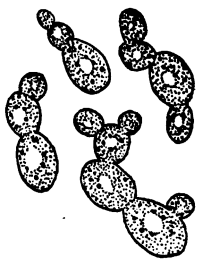
WHERE ALCOHOL COMES FROM

CIDER, beer, wine, brandy, and whiskey are some of the drinks that contain alcohol. Cider is made from apples and pears; wine, from grapes and berries; beer, from barley; whiskey, from corn and rye. Good fruits and grains, are they not? One might think that the drinks made from them might be good also. All these drinks, however, contain more or less alcohol.

The first question you will probably ask is: "How did the alcohol get into the drinks if no one put it there?" If you will perform a little experiment, and if you have a good microscope, it may be possible to give an answer to your question, that you will understand.

Dissolve a small piece of a yeast cake in about a tablespoonful of water. Add this to a pint of warm water in which two tablespoonfuls of molasses have been dissolved. Place the mixture in a quart fruit-jar, cover it loosely, and let it stand in a moderately warm place — about 70° F. — until the following day. On seeing it then you will say that it has "worked." Bubbles of gas will be seen rising, and the liquid will have a sharp,

biting taste. If you lower a lighted match into the jar, the light will go out. Something is in the water and something is above the water that were not in the jar yesterday. What has caused the change? Yeast? Yes, yeast is the workman that caused the liquid to "work."



What is yeast? If your teacher will mount on a slide a drop of the liquid and place it so that you can look at it under a microscope, you will see floating about a great many tiny roundish bodies that are, we are told, not more than one three-thousandth of an inch in diameter. If you watch them, you will observe that they are of different sizes, that some are alone and some are joined in groups, and that coming out on the roundish bodies are little buds that finally break away and go by themselves. These little bodies are some of the lowest forms of plant life. They are known to be living because they take food from the liquid in which they are placed; they grow, bud, increasing very rapidly in numbers, and may be killed by heating and other means. The yeast plants, or cells, as they are called, show no signs of life until they fall into a sweet liquid. Then, if there is the right amount of heat and air, they begin to feed and grow and produce other cells. The food that

they use is taken from the sugar, and the part of the sugar that is not used is changed into alcohol and the gas called carbonic acid gas, such as you saw escaping in bubbles. You said of the sweet juice, "It has worked." It was really the little yeast plant that worked and worked swiftly to cause the change in the liquid.

It has been found that the yeast plants that did this work in the jar of sweetened water cause similar change to take place in cider, beer, wine, and other fermented drinks. (Find the meaning of "ferment" and "fermentation.") The yeast plants are not always compressed into a yeast cake. They are floating in the air and are on the outside of the skins of fruit. As soon as the juice is pressed from the fruits and grains, unless it is heated and sealed, the tiny plants get into it, and begin their work on the sugar, changing it to alcohol and the gas.

Therefore, if yeast is put directly into any sweet liquid it will cause it to ferment and there will be a certain amount of alcohol; or, if a sweet liquid is left exposed to the air, the yeast-cells that are already in it or that will get into it from the air will cause fermentation and produce alcohol. When yeast is put into bread the same change takes place. There is sugar in

the dough, alcohol and gas are formed, and the bubbles of gas trying to escape from the dough make the dough light. When the bread is put into the oven, the heat causes the little alcohol that has formed to pass off completely, or so nearly that it is not perceptible and has no effect so far as we know.

Write a description of the experiment — tell what materials were used, how they were used, and the result of the experiment.

Write a description of the yeast plant — tell how it looks and grows, where it feeds and grows, and about the work it does.

EMERGENCIES

LESSON 86

FIRST HELP TO THE INJURED

Find the meaning of "emergencies." Can children ever do anything in case of a serious accident to some one in their presence? They might be able to do a great deal if they knew what to do. The injured might be made comfortable, at least, and in some cases even life might be saved. The right thing must be done promptly and coolly. Whatever happens or has to be done the first essential in giving help is to "keep cool." Physicians have given simple advice in regard to the following:

Sprains and broken bones. — Place the injured part in a comfortable position. Keep the patient warm and quiet. If it is necessary to move him, lift him very gently so that no strain comes on the broken or sprained parts, and lay him on a stretcher, shutter, or boards.

Fainting. — Give the patient fresh air. Lay

him flat on his back with no pillow under his head. Loosen his clothing. Fan his face or sprinkle it with cold water. Keep him on his back even after he becomes conscious.

Burns. — If your own clothes catch fire do not run. Catch up anything that is at hand, a rug, shawl, or coat, woollen, if possible, and wrap it around you to smother the flames. Whatever you do, don't run. While you are running, you may be seriously burned. If there is no other help, lie down on the floor or the ground and roll over and over. In this way you may put out the flames.

Remove clothing very carefully from burns. The chief thing in caring for burns is to keep the air from them. Apply soft cloths wet with sweet oil and wrap a dry bandage on the outside.

Drowning. — Different methods are used to revive persons who have been apparently drowned. The methods all have the same end in view, that is, to restore breathing. The following aid might be given by even a child. 1. Loosen or remove the clothing about the throat and waist. 2. Turn the patient on his face; stand astride his body; place your hands under his hips, and lift his trunk so that the water that may be in his windpipe may run

out of his mouth. It may be necessary to open his mouth and pull out his tongue. 3. Place the patient on his back. Grasp his arms at the elbow and raise them upward until they meet over his head. Give the arms a firm pull. This movement enlarges the chest and tends to make the air enter the lungs. Bring the arms back to the sides until they press hard against them. This act forces the air out of the lungs. Raise and lower the arms in this manner about fifteen times a minute. Sometimes this movement of the arms has been kept up for several hours and in the end the patient has revived. 4. When breathing has commenced, wrap the patient in blankets and rub his limbs vigorously toward his heart. Give him nothing to drink until you are sure he can swallow.

Bleeding. — If a small blood-vessel is cut, apply a tight bandage to stop its bleeding. If a large one is cut, the immediate need is for pressure on the wound with the fingers, a handkerchief, or anything available. Make a knot in a handkerchief or piece of cloth, and tie it loosely about the limb, placing the knot over the wound. Then insert a small stick or pencil under the bandage and twist it tight enough to stop the bleeding.

Choking. — A sharp slap between the shoulders will often dislodge a small object from the throat. Holding a child up by the heels and giving him a little shake will often loosen an object in the throat and cause it to drop out of his mouth.

Sunstroke. — If a person has sunstroke his skin will be dry and hot. The important thing to be done is to cool the body. Remove the patient to a cool place, raise his head, and apply chopped ice to his head and the back of his neck. Rub ice over his chest. If there is no ice at hand, use cloths wet in cold water and slightly wrung.

(Sample of pages to be reserved in the pupil's blank-book for Good Health Club Rules. See pages x and 14.)

GOOD HEALTH CLUB

Motto: As I wish to be healthy, happy, and useful, I will try to keep the following rules:

1.

2

3.

4.

(To be copied and filled out in the pupil's blank-book. See page 15.)

RECORD OF GROWTH

Name_____

Age_____

School_____

Grade_____

Month	Sept.	Dec.	Mar.	June
Weight				
Height Standing				
Breadth of Chest				
Right Upper Arm				
Right Fore Arm				

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